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CO-OPERATION

Agricultural Co-operation in Italy.

Agricultural co-operation is of comparatively recent origin in Italy. Apart in fact from the co-operative dairies (*latterie sociali*), the primitive forms of which are found in very early times, co-operative societies first appear in 1865. In that year the popular banks (*banche popolari*) of Milan, Cremona and Bologna were set up; in 1883 the first rural bank (*cassa rurale*) was established at Loreggia, in the province of Padua; in 1886 the first co-operative land-holding societies (*affittanze collettive*) were formed, followed in 1889 by the first agricultural consòrtia (*consorzi agrari*). Thus the movement for co-operation among farmers gradually spread over the country, developing side by side with the growing application in agriculture of the principles of chemistry and mechanics. Conscious of their inability to avail themselves singly of the advantages to be derived from the application of these principles, the farmers realised the need of organisation among themselves with a view to overcoming by co-operation the disabilities of the individual. The occupiers of small and medium sized holdings, so numerous in Italy, were, in particular, enabled by means of co-operation to enjoy the same advantages as the larger farmers.

In accordance with the varied physical and economic structure of the different regions of Italy, with the system and distribution of land tenure, with the many and varied types of cultivation, the economic organisation of the agriculturists has assumed very varied forms, has been applied to many branches of agriculture and has even developed original types of co-operation.

The co-operative societies are more generally diffused in Northern Italy, where the early associations of landowners for execution of land improvement and irrigation works had, so to speak, prepared the way; those with which it is proposed to deal may be grouped approximately into the following classes: 1. co-operative credit societies; 2. co-operative societies for the purchase of requisites; 3. co-operative societies for production and sale; 4. co-operative labour societies; 5. co-operative land-holding societies; 6. co-operative insurance societies or agricultural mutual insurance societies.

Before reviewing the various types of co-operation with some indication of the most characteristic features in each case, some account should be given of the comprehensive work of re-organisation and continued supervision of the co-operative movement as effected by the National Government, and also of the legal basis and fiscal treatment of the societies. The co-operative system as it exists in Italy of to-day (1) may in fact be considered as the outcome of a process of rehabilitation and selection, and it is essential to understand the underlying principles of this process.

(1) "La cooperazione nell'Italia fascista", published by Roberto Scheggi. Istituto Superiore per la Cooperazione. Rome, 1929.

I. THE WORK OF RE-ORGANISATION ACCOMPLISHED BY THE NATIONAL GOVERNMENT.

It has been remarked (1) that in Italy one of the most striking results of the war has been the great development of co-operation, the post-war conditions undoubtedly providing new and special reasons for such development. As regards co-operation in general, there is available a return of all the co-operative societies legally constituted at the end of 1915 and in May 1921. In this return however a number of societies are not included which, although not assuming the legal form of co-operative societies as prescribed by the Commercial Code (*codice di commercio*), do in fact fulfil the economic function of these. The figures are given here, excluding the mutual insurance societies and the credit societies for which comparable returns for 1915 are not available:

	31 December 1915	May 1921
Consumers' co-operative societies	2,312	6,481
Other co-operative societies	5,939	11,362
	8,251	17,843

In regard to agricultural co-operation, on comparing the figures, taken from an unofficial source (2), for 1913 and 1925, it appears that the total number of the co-operative societies rose from 5,296 in 1913 to 7,533 in 1925. This "co-operative inflation" which was especially marked in the years immediately following the war might be explained, *inter alia*, as the outcome of measures the real intention of which had not been always well understood and which had resulted in the formation of a number of societies inadequately capitalised and technically inefficient. These had in practice frequently shown themselves unable to attain the ends which it had been intended to encourage by the legislation in question. In addition in some cases the managers were not thoroughly well trained for their duties and had been unable to confine the societies for the direction of which they were responsible to the purely economic sphere. The consequence was that when under pressure of requirements of reconstruction, Italy was obliged to adopt a stricter order, many societies became bankrupt or were at least greatly cramped for means and disorganised in action. To remedy the position and with a view to ensuring the regular working of the co-operative societies, the Decree-Law of 30 December 1926, No. 2288, was promulgated. By this Decree it was enacted that "when co-operative societies are working irregularly or are failing to carry out the provisions of the rules, or when the attainment of the objects for which they were formed is in any way compromised", the competent Minister may arrange for inspection of the working of the societies and may order the dissolution of the committees of management. The power of supervision over the societies being thus established, with a view to facilitating the re-organisation, the same Decree set up the National Institute of Co-operation (*Ente Nazionale della Cooperazione*) in which the societies may be enrolled and find therein "full opportunity for enquiry into and discussion of the questions relating to the many and various activities included in the co-operative movement, the purpose being to co-ordinate and improve the working of the societies so grouped and to establish a close link between them and the State administration".

(1) Arrigo SERPIERI: *La guerra e le classi rurali italiane*, Bari, Laterza, 1930.

(2) Carlo DE CAROLIS: *Elenco delle società cooperative e mutue agrarie esistenti in Italia al 31 dicembre 1913 e "La cooperazione agraria in Italia"*, Istituto Nazionale di Credito per la Cooperazione, Rome, 1927.

The Institute, while exercising its powers in relation to societies the enrolment of which is voluntary, has none the less the character of a public institution, called upon to collaborate in respect of the co-operative movement with the Government Offices. The Government thus may entrust the carrying out of the inspections in the cases indicated to the Institute. This general "overhauling" has led to the gradual elimination of the weaker and ineffective organisations.

The remaining organisations and those of recent formation appear to be better equipped technically and more responsibly administered. The managing committees appear to have had a more thorough training and the members are better disciplined. In both is found a fuller sense of responsibility as well as more accurate acquaintance with the means of production, their cost and their yield. Latterly in connection with the difficulties due to the agricultural crisis, the co-operative undertakings have sought to modernise their plant and to introduce scientific management into their methods of work. It may be said that from the confusion of the war and post-war period the agricultural co-operative movement has emerged, if somewhat reduced, at least improved in quality.

The co-operative societies are grouped into self-governing national federations according to their kind, there being in all eight: they are subordinate to the National Institute of Co-operation in respect of all the work "of enquiry, statistical investigation, supervision and assistance, co-ordination, and generally in respect of the safeguarding to the interests of co-operation". As regards labour relations existing between co-operative societies and persons dependent on them the collective labour agreements hold good as drawn up by the syndical Confederations of similar undertakings (1).

The societies receive from the Institute assistance in their administration, in addition to technical and legal assistance; and an active propaganda is carried on by means of its own organ *Il Lavoro Cooperativo* as well as by its provincial Committees, which undertake to diffuse among the population generally the theory and practice of co-operation. In 1921 there was established in Rome under the auspices of the National Institute the Higher Institute of Co-operation and Social Legislation where courses are held on co-operative subjects annually by experienced instructors with a view to the training of the staff required for the direction and management of the societies (2).

In co-operation, thus placed on a new and sounder basis, the Government has recognised a useful instrument for carrying on the "economic campaign", and has accordingly appointed representatives of the movement on the various bodies which play an important part in the economic life of the Nation and in particular on the National Council of Corporations (*Consiglio Nazionale delle Corporazioni*), established by the Law of 20 March 1930, No. 206. This Council is the central body of the new syndical organisation.

2. LEGAL BASIS AND FISCAL TREATMENT OF THE CO-OPERATIVE SOCIETIES.

Co-operative societies in Italy may take any of the forms contemplated by the ordinary law for societies, *i. e.*, the unregistered society (*società di fatto*), the civil society (*società civile*) and the trading society (*società commerciale*). This last type

(1) On the syndical organisation introduced into Italy by the Law of 3 April 1926, No. 563, see the article published in the *International Review of Agricultural Economics*, No. 3 (July-September) 1926 International Institute of Agriculture, Rome.

(2) Oddone FANTINI: *Educazione e cultura cooperativa in Italia e all'estero*. Istituto Superiore di Cooperazione e Legislazione Sociale. Rome, 1930.

may be of three kinds : (a) unlimited liability societies (*in nome collettivo*), in which the obligations of the society are guaranteed by the joint and several liability of the members ; (b) the society *in accomandita* in which the obligations are guaranteed by the unlimited joint and several liability of one or more members and by the liability of one or more members up to a certain sum only, which may be represented by shares; (c) a limited liability society, in which the obligations of the society are guaranteed only up to a fixed capital sum and no member is liable for more than the amount of his contribution or share. Generally speaking however the societies of a co-operative nature take the form of a co-operative society governed by the provisions of articles 219-228 of the Commercial Code (Chapter IX, Section VII), the fundamental principles of which may be summarised here as follows.

In the first place co-operative societies are in Italian law societies with capital the amount of which may vary, and having an unlimited number of members. The guarantee as regards the members themselves consists in the provisions of the law, *viz.*, that whatever form is adopted the societies are constituted by public act, and that the court shall assure itself of the regularity of their constitution.

The capital of the societies being variable, the conditions of admission and withdrawal, voluntary or otherwise, of members must be clearly stated in the rules. There must be proper precautions against the wholesale resignation of members which would leave the creditors without guarantee, as also against too large an accession of new members which might lead to an expansion of capital beyond the needs of the undertaking. Co-operative societies however, although they may make conditions for the admission of members, are not empowered to limit it unconditionally ; for example, to say that membership must not exceed a given number.

In view of the fact that the capital of co-operative societies is constantly fluctuating in amount, the law exempts these societies from all obligations that presuppose the existence and the maintenance of a fixed capital. Thus they are exempted from the obligation of having the whole capital subscribed as announced in the prospectus, and from that of going into liquidation if there are losses up to two-thirds of the capital. Moreover, article 224 of the Code, which provided that no person could have a greater interest in a co-operative society than 5000 liras, and that the nominal value of the share could not exceed 100 liras, has been amended by the Decree-Law of 10 February 1927, No. 196, which became a law on 18 November 1928. (No. 2689). This limit being regarded as insufficient, in relation to the reduced value of the currency, to ensure the building up of an adequate capital by the co-operative societies, the interest which a member can have in a society has been raised to 30,000 liras, and the nominal value of the shares has been fixed for the new societies at the maximum amount of 500 liras and a minimum of 100 liras. This provision has proved to be especially useful in respect of agricultural co-operation for which the smallness of the members' contribution had been in the past one of the greatest obstacles to the carrying out of schemes and new departures which need adequate capital for their realisation.

In order to avoid speculation on the exchange in the buying and selling of shares, the law prescribed that shares shall always be held by name and shall not be transferable until fully paid up, and only after authorisation by the general meeting or the Council of Management. Every member has the right to one vote only whatever may be the number of the shares held. Since it is the intention of the law to facilitate the exchange of services between the society and the members, it is provided that the managers — who may be exempted from the obligation of giving security — shall be chosen from amongst the members and that the members, so far as poss-

ible, shall be present personally at the general meetings. The operations of the society with the members are also facilitated as for every credit allowed to the members the society may insist that the shares held by them shall serve as security, to the exclusion of their private creditors.

These early provisions of 1883 were subsequently supplemented by laws allowing labourers' co-operative societies to undertake public works promoting the formation of consortia between co-operative societies for production and labour, facilitating the building of cheap dwelling houses by means of co-operative societies, etc.

As regards the fiscal treatment of co-operation, the provisions are found scattered in various laws, relating either to finance or to special forms of co-operative societies. It would occupy too much space to enumerate these laws and it is of more importance to note the new policy followed by the National Government in this respect. This in substance consists in limiting the fiscal privileges assigned to these societies, in the hope that they will maintain themselves by their own efforts and not owe their continued existence to artificial privileges and the like. This principle is emphasised clearly in the Royal Decree of 30 December 1923, No. 2,882 containing provisions for ensuring the observance of the Law on registration, and regulating, *inter alia*, the practical application of the fiscal privileges granted to co-operative societies. Essentially it introduces general limitations and special limitations for the societies. By the former the period for any fiscal exemption is reduced to ten years, or more precisely : the privileges of the exemptions or reductions in regard to the registration taxes, stamp taxes, taxes in lieu of the registration or stamp tax, mortgage taxes or on government concessions, charges for deeds and contracts, given in favour of individuals, societies, public bodies and institutions apart from charitable institutions, without determination of time or for a period longer than ten years, will come to an end by law at the end of the tenth year from the date of coming into force. Accordingly the exemptions which up to the time of the Decree were established without time limit in favour of the co-operative societies, such as those prescribed by art. 228 of the Commercial Code (documents referring to amendments of rules, to admission and withdrawal of members) are to be limited to ten years from the date of coming into force, *viz.*, from the date of the foundation of the society. The privileges themselves will cease by law, even before the lapse of time indicated, whenever the balance sheets of the societies show a net profit on the working higher than the interest reckoned at the official rate on the actual paid up capital or the foundation capital. It is clear that the intention of this provision is to bring all undertakings, after a suitable period for establishing themselves, under a normal arrangement as to taxation ; it was thought that a term of ten years would be usually sufficient for an undertaking, however new and weak or with however long a yield cycle, to be able to stabilise itself in such a way as to have amortised or nearly so its plant or to have organised its working, and thus to be in a position to meet the ordinary fiscal burdens.

Passing on to the conditions for application of the privileges to the co-operative societies, the Decree enacts that the fixed minimum fee shall be payable on the registration of the documents relating to the operations of the popular banks and of the co-operative societies, provided that the following requirements are complied with :

- (a) that they are conducted in accordance with the principles and methods of co-operation ;
- (b) that the actual paid up share capital does not exceed 30,000 liras ;
- (c) that the agreements to which the documents relate have been made within five years from the date of foundation ;

- (d) that the account books are regularly kept ;
- (e) that the documents not subject to tax must refer to operations contemplated by the rules and not merely to acts of mediation or to resales to third parties ;
- (f) that the value involved in the document for which the privilege is requested must not exceed twenty times the paid up share capital, an exception being made for the co-operative societies for the building of cheap dwelling houses and for societies undertaking public contracts.

The condition under (a) is taken as satisfied when in the rules of the co-operative societies as legally constituted there are expressly laid down the following provisos : 1. in the event of distribution of dividends, the proportion of these must never exceed the rate of official interest on the capital actually paid up ; 2. prohibition of any division of the reserve funds among the members during the existence of the society ; 3. in the event of the winding up of the society the whole of the owned capital, deducting only the repayment of the capital actually paid up by the members, must be assigned to objects of public utility, of which the financial administration is competent to judge.

The benefit of the fixed tax mentioned above is limited, for the agricultural and building co-operative societies, to the first assignment of the land or house to the member ; the ordinary tax is to be paid on subsequent voluntary cessions to the society and on any later assignments of such property. This provision has a tendency to check speculation on higher sale prices of houses and farms.

The duration of the special privileges will lapse with the constitution of the society, even if the society on dissolution is reconstituted, or transformed or revived under another form. The object of this rule is to render useless the expedient, formerly practised by organisations and societies, of regaining the fiscal privileges lost through lapse of time or excess of capital, in other words of dissolving and re-constituting themselves without any change in the scope of their real economic activity, and hence recommencing operations on a privileged basis.

The various types of co-operative societies will now be described, and any special fiscal provisions or provisions of any other kind will be noted in connection with the co-operative societies to which they relate.

3. CO-OPERATIVE CREDIT SOCIETIES.

For a long time co-operative credit was almost the only form of co-operation in Italy. It arose first in the towns and not in the rural areas, and the earliest credit societies were of the Schultze-Delitsch type, adapted to the special conditions of Italy by Luigi Luzzatti. These societies took the name of " popular banks ". They preceded the rural banks, but when these latter began to be formed, the popular banks did not cease to extend their benefits to agriculture ; on the contrary they often gave assistance to the rural banks. However while these are specially intended to benefit the small holder, the popular banks prefer to deal with the middle classes whether traders, artisans or farmers, and have a somewhat wide field of action (1). There are about 600 popular banks, distributed as follows : Sicily 132, Emilia and Romagna 55, Lombardy 50, Euganean Venetia 45, Latium and the Sabines 41, Calabria 41, Campania 36, Marches 33, Apulia 32, Tuscany 27, Julian Venetia 25, Piedmont 16, Abruzzi and Molise 14, Umbria 11, Basilicata 10, Liguria

(1) Giacomo ACERBO : *Storia ed ordinamento del credito agrario nei diversi paesi. Federazione Italiana dei Consorzi Agrari. Piacenza, 1929.*

9, the Trentino 8, Sardinia 4. There is a large number of branches and agencies which spread the benefits of the activity of headquarters, acting as channels for the flow of surplus funds of the towns towards the farming centres. It may be noted that there is an extensive movement towards the amalgamation of the minor organisations, and towards a stricter control of the management and more careful protection of the interests of depositors.

A characteristic feature is the variety of the elements of membership of these banks; among the members are farmers, day labourers, manufacturers, traders, workmen, employees and persons following different occupations.

The popular banks work for the most part with the capital that comes to them spontaneously in the form of shares and deposits, and to a lesser extent with the funds that they obtain by re-discounting bills or contracting loans. The deposits are of different types: the middle classes not engaged in trade place their savings in these banks in the form of deposits or small savings; the commercial and industrial classes prefer deposits on current account; institutions, workers' societies and mutual aid societies prefer to deposit their surplus funds and take out interest bearing bonds with a due date. The Italian popular banks adopted from the beginning the use of interest bearing bonds with a due date, and were thus in a position to extend their operations including loans to farmers on longer terms than is customary. These many and varied forms of deposit tend to give elasticity to the operations. Of importance too are the reserves built up by the assignment of a part of the profits at the end of the financial year.

The capital collected by the above methods is employed in credit operations consisting of loans or advances on security of bills, discounting of bills, overdrafts on current account, and advances of money on the pledge of securities and goods. Trade, industry, agriculture, small crafts, individual and collective labour, the most varied productive undertakings, all were nourished by this popular credit. In particular the farmers who are members or customers of these banks have found them to be of great advantage. From the latest official statistics it appears that in the year 1908 alone this class benefited by nearly 500 million liras in loans and discounts, and the farmer, in fact, obtains credit at these banks under other forms, on current account, advances on security of bills, mortgages or bonds; as mortgage loans, advances on pledge of commodities. Some of the wealthier banks, such as those of Milan, Bergamo, Cremona, Bologna, Novara, Lodi, Mantua, Pavia, etc., have made and continue to make advances to other societies, especially to agricultural consortia, co-operative land holding societies, co-operative dairies and wine-making societies, and to co-operative societies for production and labour.

Special mention may be made of the assistance given in improving conditions within their area of operations. They have frequently facilitated the carrying out of important land improvement and irrigation schemes and other works of public utility.

On 31 December 1928, the following was shown to be the position of 470 popular banks (1): paid up capital, 350,712,055 liras; reserve funds, liras 306,629,026; deposits and current accounts, 5,164,423,928 liras; bills in hand, 3,577,883,723 liras; net profits, 70,226,898 liras.

In connection with the syndical organisation established in Italy by the Law of 3 April 1926, No. 563, there came into existence the National Syndicate of Popular Banks of which 319 banks were members in July 1930.

(1) *Annuario delle Banche e Banchieri d'Italia. Anno 1929-30. Confederazione Generale Bancaria Fascista. Sezione Economico-Finanziaria. Rome, 1930.*

Another main group of co-operative credit societies in Italy is formed by the rural banks, typical institutions supplying credit for working capital in agriculture. These undertake for the country districts the same work that is carried out in the towns and large agricultural villages by the popular banks. They are mainly agricultural in their scope, dealing almost exclusively with the small farmers, whether occupying owners, cash tenants (*affittuari*), tenants in emphyteusis, or share tenants (*coloni parziari*). The first rural bank was formed in 1883 at Loreggia in the Province of Padua by Leone Wollemborg; it was quickly followed by many others, partly as the result of the propaganda of Wollemborg and others who adopted his idea, but more largely as the outcome of the Catholic social movement. Their economic constitution is modelled on the Raiffeisen type; all are formed with joint and several unlimited liability, but while those which were formed by Wollemborg and his followers are non-confessional, those founded by Catholics were definitely confessional in character.

The rural banks have a limited area of operations. At the time of formation they have no owned capital; only gradually do they build up an owned capital partly by means of the small fees paid by members when joining the society, or even when obtaining their first loan, but mainly by the profits on the year's working which are entirely allocated to the reserve fund. Owing to the character of the society there is no opportunity to divide the profits among the members. Funds for making loans are derived from deposits, and loans are usually made by discounting bills and are given to members for various purposes connected with the working of their holdings. The loans are made for somewhat short periods, the length of which must in no case exceed the cultivation period of the crop in respect of which they have been granted. Exceptionally, loans are made for operations that are not strictly agricultural, but always in connection with some very modest requirement and for a very brief period. It is characteristic of the rural banks that they give many small loans for specific purposes, and assure themselves that the sums advanced are actually applied to those purposes. Security in respect to third parties is formed by the assets of the members. The officers being unpaid, expenses are small and thus the interest on the loans can be kept low.

From the very simple character of their organisation rural banks can be worked in the smallest villages where other banks could not be maintained and where the members know each other well and act as a check on each other; in this way the risks of the operations are much reduced.

In addition to their principal operations of accepting deposits and making loans, some banks have taken up other work for the benefit of their members, such as the joint purchase of farm machines and other requisites, mutual live stock insurance, co-operative land-holding schemes, etc.

Under a legislative proposal recently put forward by the Government, provision is made for a radical reorganisation of the rural banks in accordance with the following principles: in the first place the name (*cassa rurale*) is reserved to these banks, no other body being permitted to assume or to retain such designation; it will not be possible to proceed to the formation of a new bank, unless the membership attains the minimum fixed by the law. Members are expected to subscribe one share of the capital the total of which is fixed by the rules, such share in no case to be less than 100 liras. The capital of banks formed after the new law must be constituted in money and for a sum which is not less than a given minimum. The banks are empowered to supply credit for working capital in agriculture both independently and as intermediary bodies of the regional agricultural credit institutions which usually refrain from undertaking operations in places where a rural bank

exists. Banks must employ their available funds exclusively in favour of members ; besides giving credit for working capital in agriculture they are empowered, so far as provided in their rules, to undertake ordinary credit operations not exceeding in all a certain proportion, to be fixed by the law, of the whole business undertaken.

The banks must deposit, as interest bearing current account with institutions named by the Law, 20 per cent. of the deposits entrusted to them besides sums in excess of the requirements of each society. Each bank can operate only within the territory of the commune in which the society has its headquarters, but it may be empowered to extend its activity over one or more of the neighbouring communes.

The same economic structure and legal basis, is found in the case of the agricultural banks (*casse agrarie*) which have been formed as co-operative societies in Southern Italy and in the Islands to give effect to the special legislation on agricultural credit, and to act as intermediary bodies for the distribution of credit as between the regional institutes and the individual farmers.

The rural banks are grouped under local federations which are themselves members of the National Association of Rural and Agricultural Banks and Auxiliary Bodies (*Associazione Nazionale fra le Casse Rurali, Agrarie ed Enti Ausiliarii*). This Association has recently completed an accurate statistical return showing the position of these banks on 31 December 1928. The total number of banks represented by the Association was 2,682 (that is, 2,292 rural banks and 390 agricultural banks), and of these 2189 were affiliated to the National Association. The following is the distribution of the banks in the Kingdom of Italy (1): Abruzzi and Molise, 65; Basilicata, 32; Calabria, 155; Campania, 74; Emilia 242; Latium, 121; Liguria, 18; Lombardy, 221; Marches, 111; Piedmont, 83; Apulia, 45; Sardinia, 142; Sicily, 331; Tuscany, 166; Umbria, 28; Euganean Venetia, 307; Julian Venetia, 204; Trentino, 337.

At the date indicated the deposits amounted to 1,214,233,786 liras; the loans outstanding, that is to say sums granted for agriculture, to 761,005,121 liras. The securities belonging to the banks, almost all of which are State securities, represented a total value of 133,201,127 liras. The aggregate capital formed by the members' entrance fees amounted to 9,807,426 liras and the reserve funds to 61,496,358 liras.

4. CO-OPERATIVE SOCIETIES FOR THE SUPPLY OF REQUISITES.

Joint purchase is an important branch of agricultural co-operation inasmuch as it serves to protect the farmers against exaggerated prices and inferior quality in buying their requisites. It was originally practised in Italy by associations of a technical kind which were, as such, in a better position to appreciate the advantages derived from the new methods and processes of cultivation and were anxious that their members should benefit thereby. With this object these associations established a special section for trading activities. The same development took place with the *comizi agrari*, which were instituted from 1866, and were at that time the bodies which officially represented the rural classes. In 1873 the Friuli Agricultural Association included among its activities the formation of an *Ufficio di commissioni agrarie*, the object of which was to supply silkworm seed and farm machines. In 1884 the *Unione Viticola di Canneto Pavese* decided to purchase in the joint interest of members all that was needed for the practice of agriculture. Thus by degrees the work of collective supply of requisites has been undertaken by other types of

(1) "Le casse rurali italiane al 31 dicembre 1928". *La Finanza Cooperativa*, organ of the *Associazione Nazionale fra Casse Rurali, Agrarie ed Enti Ausiliarii*, fasc. 1. Rome, January 1930.

societies, which were not formed expressly for the purpose, and at the present time such a function is performed either as principal object or subsidiary activity by technical societies, rural banks, agricultural syndicates and consortia, agricultural unions and, in the three Venetian provinces, by farmers' clubs (*circoli agricoli*) and "co-operative families" (*famiglie cooperative*).

The most important group among these is that of the agricultural consortia (*consorzi agrari*), which are co-operative societies with limited liability, organised for the purpose of making direct purchases — either singly or in association with other similar bodies, or through their Federation — of farm machines or other farm requisites, such as fertilisers, seeds, spraying materials, feeds, etc. with a view to resale to members and even to non-members, with provision for strict control of all purchases so as to afford guarantee of quality.

It may be noted that by obtaining loans from their Federation (1), the consortia put themselves into a position to sell requisites to farmers even on credit, so that the farmer need not approach the banks but can obtain by a very simple and rapid procedure the commodities he requires while postponing the payment to a more convenient time. These consortia represent institutions especially suitable for granting agricultural credit in kind and thus actually directed on to the soil.

The profits are in part returned to the members as a bonus proportionate to their purchases from the consortia, in part they are allocated to the payment of the maximum interest allowed by the rules to be paid on the shares. The consortia have established branches or depôts at the chief towns or in the villages within the area of their administration. The management is entrusted to an expert and usually well-paid staff; this explains the good results obtained. It may be calculated that the consortia sell annually requisites to the value of more than a thousand million liras.

In the last few years a tendency has been noticeable among the consortia to extend their action to new forms of activity, and to combine their specific work of trading with other undertakings (2). In the economic sphere mention may be made of what may be regarded as the great achievement of the Italian co-operative societies for supply of requisites, namely, the establishment of co-operative super-phosphate factories to which special reference will later be made; some consortia have engaged in the production of selected seeds, setting up for the purpose special organs and offices with laboratories for seed analysis. A large number of the consortia possess large plants for mechanical grading of cereals and seed grain. Others have opened general warehouses for cereals and other products, combining the provision of storage with that of credit. In the mulberry growing areas cocoon drying plants are often worked by consortia. Of late there has been a movement towards assisting growers in the cultivation of tobacco. The consortia of Piacenza, Cremona, Lodi, etc. have encouraged the manufacture of cattle-cakes. Other societies supply their members with seedlings of vine, mulberry, olive, poplar, or arrange for the importation of improved breeds of live stock or have established stud farms or constructed silos for forage. In some cases mills or paste factories are being worked. Mention should also be made of the work done in directing the efforts of the farmers in the establishment of organisations of a commercial or industrial type benefiting agriculture. There are also consortia for the campaign against phylloxera, consortia

(1) In 1929 the ratio between the sales effected by the Federation to the consortia and the total amount representing bills accepted in payment of goods was 47.4 per cent.

(2) Emilio MORANDI: *L'azione dei consorzi agrari nel campo economico e nel campo morale. Federazione Italiana dei Consorzi Agrari. Piacenza, 1925.*

of tobacco-growers, stock-breeders' associations, societies for the alpine pasturing of stock.

The sphere in which the consortia are now being specially urged to act, is, however, that of the marketing of agricultural products. In a report presented to the Conference of Agricultural Consortia held at Piacenza on 15-16 March 1925 (1). Prof. A. SERPIERI pointed out that the experience of the last few years, in particular that of the two most important Italian agricultural markets, wheat and wine, had shown the necessity for organising for the protection of the growers. In fact the problem of organisation of sales is the most real and most urgent of the problems with which agricultural co-operation has to deal at the present time. This type of society which has already done good work in the direction of joint purchase is well equipped for the new function, and has already in some cases achieved success therein (2).

There are no general recent statistics available on the societies for supply of agricultural requisites, the latest giving the returns up to 1921 only, but certain data are to be had on the position, in recent years, of some groups of societies of this kind, which may be given here :

	1923	1924	1925
Societies	407	379	350
Members	287,243	290,641	254,436
Share capital . . . Liras	39,948,817	45,715,114	51,451,698
Reserves »	24,029,093	28,444,691	29,719,825
Value of goods sold »	897,811,476	889,273,563	1,108,958,359
	1926	1927	1928
Societies	331	312	263
Members	238,272	241,072	228,371
Share capital . . . Liras	50,956,455	52,905,628	56,421,938
Reserves »	30,579,699	27,710,136	25,738,037
Value of goods sold »	1,170,054,562	945,875,607	1,006,619,531

About 55 per cent. of all farm requisites are supplied by these co-operative societies, which thereby exercise a steadying influence on prices. The most important central organisation of these societies is the Italian Federation of Agricultural Consortia (*Federazione Italiana dei Consorzi Agrari*) formed in 1892 at Piacenza. On 31 December 1929 there were 592 (3) societies affiliated to the Federation-

(1) A. SERPIERI. *Credito e consorzi agrari. Federazione Italiana dei Consorzi Agrari. Piacenza, 1925.*

(2) G. PANIZZI: Generalizzare le vendite collettive dei prodotti agricoli. *Giornale di Agricoltura della Domenica*, No. 3, Piacenza, 19 January 1930.

(3) The number of societies belonging to the Federation in 1927 was about one thousand; but latterly it has been felt to be advisable to amalgamate the smaller bodies so as to form organisations with a wider sphere of action, possibly covering a whole province. The management expenses are thus reduced while more efficient working is secured, an essential point in the present position of agriculture.

with about 500,000 members. The Federation is the largest co-operative institution in Italy engaged in agricultural business; its work on behalf of the farmers is not confined to the economic field; it helps them in technical matters, and also does considerable educational and social work on their behalf. It has an administrative and a commercial section and also one for propaganda. The commercial section consists of two offices: (a) the Office for the purchase and sale to farmers of farm requisites (fertilisers and their raw materials, spraying materials, seeds, feeds, etc.); (b) the Machinery Office which is engaged in the trade in farm machines and implements. It may be noted that the Federation only buys on the account of the consortia and does not do business with individuals, while the consortia are free to make their own purchases either with the Federation or elsewhere. The following figures represent the trading activities of the Federation during the last four years.

Value of commodities and machinery sold by the Italian Federation of Agricultural Consortia in the years 1926-29 (liras).

	1926	1927	1928	1929
Commodities . .	375,027,838	277,981,453	315,178,368	342,141,730
Machines . . .	37,599,668	32,485,593	23,719,080	29,147,539
Total . . .	412,627,506	310,467,046	338,897,448	371,289,269

The Federation obtains the credit necessary for trading operations from the larger banks. The federated societies also obtain adequate credit from local banks and take part in the financing of the commercial operations of the Federation. In 1921 the National Bank of Agriculture (*Banca Nazionale dell'Agricoltura*) was founded, on the initiative of the Federation, with a capital of 28 million liras.

In connection with the need already indicated of a more active organisation of the marketing of farm products, the Federation has recently established a Section for the Co-operative Marketing of Agricultural Produce (*Sezione Vendite Collettive Prodotti del Suolo*) with headquarters at Bologna, which in 1929 sold fruit and vegetables to the value of more than 15 million liras. It has also set up two Offices, one for the co-operative marketing of cereals at Naples, and the other for the co-operative marketing of wines at Milan. The object of these offices is to collect through the medium of the federated societies the offers of produce made by the members of the societies and to ensure the marketing of such produce under the most favourable conditions.

The Federation also carries on an active technical and economic propaganda. The technical propaganda takes the form of the establishment of plots and fields for experiment in and demonstration of the application of fertilisers, the use of selected seeds and of farm machines, in all the regions of Italy, as also that of the publication of leaflets, etc., of a popular type.

The economic propaganda is directed towards a diffusion of the knowledge of the progress of co-operation and of the principles by which it should be guided. The Propaganda Office undertakes collection of data on the co-operative movement and on the activities of the federated societies. It is also responsible for the study of questions of agricultural economy of general interest and for the publication of statistical enquiries and investigations. A Permanent Commission of

economic questions relating to agriculture (*Commissione permanente di studi economico-agrari*) examines the more urgent problems of agricultural economy and policy and publishes valuable monographs on these subjects.

The organs of the Federation are: a monthly review of farming technique, *L'Italia Agricola*, with special numbers illustrating different branches of agriculture or different agricultural regions of Italy, and also a weekly periodical, *Il Giornale di Agricoltura della Domenica*, of a technical and economic character. An Office of Agricultural Legislation is engaged in collecting a full documentation on the legislative proposals submitted to Parliament and on the laws which have been enacted on agricultural subjects.

It may further be mentioned that in 1915 the Federation acquired a steamer of 4000 tons burden, and afterwards three other vessels to carry rock phosphate from Africa. In 1918 it set up a ship-building yard at Finalpia in Liguria, the vessels built to be used for the transport of the goods it required. In this way the Federation furnishes the first example of an agricultural co-operative organisation which owns and directly manages vessels employed in the transport of agricultural requisites.

5. CO-OPERATIVE SOCIETIES FOR PRODUCTION AND SALE.

Co-operation for production and sale takes various forms in Italy. Those types of society that have been most largely developed may be noted here.

(a) Co-operative Dairies.

Co-operative dairies (*latterie sociali*) arose spontaneously out of the necessity to apply industrial processes to milk. They sprang up in fact amongst the mountains where holdings were very small and combined effort was essential if a profit was to be made from dairying. They were first formed at Agordino (1875-76) and at Friuli (1882) and were then gradually extended to Lombardy, Emilia and other regions.

The dairies, as a matter of history, have followed three systems. The first and most primitive was that of alternation in supply of milk (*prestito reciproco del latte*) or the system of butter or cheese-making by turns among families (*sistema turnario familiare*). In this case the transformation of the milk was done successively in the houses of the different members; the milk of all the families conjointly was taken to the family whose turn it was and with the primitive equipment was there made into butter, cheese or "ricotta". The day after the milk was taken to a second family, and thus round in turn. The member whose turn it was furnished the premises, labour, utensils, fuel, salt, rennet, etc., and then in compensation had first claim on a certain quantity of the products, besides what was due to him for his own milk. Or, and more usually, if he had previously supplied to his fellow members at other times as much milk as he received on the day or days of his turn, he kept all the products for himself. This system had however several defects. In the first place it obliged every member to keep up premises and equipment adequate to the transformation of all the milk supplied by the joint undertaking; in the second place the products could not be of uniform type, varying with the more or less expert treatment; moreover the fact that the milk was collected at different times for the benefit of different members resulted in great variations in the return obtained by each. These defects soon led to the adoption of a better system, that of the so-called *turnario sociale*, the classic area of which is the central part of Friuli,

or more precisely the districts of Gemona, Tarcento, S. Daniele, Spilimbergo, Codroipo, Palmanova, and S. Vito al Tagliamento. Here in contradistinction from the earlier system, the transformation is done on jointly owned premises, with equipment and utensils in common, under the management of a *casaro* (literally, cheesemaker) appointed by the group. The products are still however assigned in turns, corresponding to the milk credit which each member has with the dairy. The turn is fixed by a committee of members which arranges from week to week the order of the turns in the working, precedence being given in accordance with the extent of the milk credit. On the day of the turn at least one member of the family goes to the dairy and assists the *casaro* in the work. All the cheese and the butter obtained that day belong to the member whose turn it was, he paying merely a tax per quintal of milk, adequate to the expenses of working and depreciation. Naturally there is never a complete settlement of the accounts, the individual members remaining, at each turn, either credited with milk or owing milk, which is carried forward to the account at the next turn. Butter is removed by the member on the day it is made, cheese after two or three months of ripening. All forms bear countersigns corresponding to the progressive number of the member to whom they refer. To meet the requirements of small milk producers who would have to wait a long time before having a milk credit corresponding to the average daily transformation, in dairies of a certain size it is the custom to have a joint or shared dairying (*caserata promiscua*), that is to say, a day's work is shared among two, three or even four members, who then divide into two, three or four shares, the butter, cheese, tax on the dairying, etc.

The residues, especially the skimmed whey, is distributed to the persons bringing the milk, in proportion, and only exceptionally does a dairy feed a few pigs so as to use up the whey not taken by the members, who usually raise pigs for fattening and breeding sows.

It has been justly observed that this form of organisation reflects the special character of the Friuli dairies which consist of small holders and also meet a special dietary requirement which is the rule among the population of the district, *i. e.*, the consumption of a large quantity of cheese as the accompaniment of bread. Every dairy of this kind has about 100 members, some over 200. In 1928 the number of the co-operative dairies of Friuli was 500, with an annual transformation of 805,000 quintals of milk and a production of butter and cheese respectively of 18,550 and 73,500 quintals (1).

With this type of society also, although to a less degree, every member is affected by the differences due to the more or less favourable season in which his turn falls and the consequent more or less satisfactory outturn. These dairies accordingly are tending to organise themselves on industrial lines, a change which comes about naturally as they really contain the elements from which the modern *co-operative dairy* is formed. Hence this third system is the result, which, in view of the increased production of milk and the requirements and fluctuations of the market, is clearly the best suited to the interests of the producers belonging to a group (2). The co-operative dairies are constituted by law with share capital subscribed by the members; credits are usually obtained for the establishment of the dairying premises and the provision of the necessary equipment, etc. The milk is worked with plant which is the property of the society by a butter or cheese-maker to whom the mani-

(1) Prof. ENORE TONI: *Le latterie sociali friulane*. Federazione Sindacati Fascisti Agricoltori per la Provincia di Udine. Udine, 1928.

(2) S. BARDELLINI: *Latterie cooperative*. *L'Italia Agricola*, No. 12, Piacenza, December 1926.

pulation of the products is entrusted. As the system of turns is done away with, the butter and cheese are not divided among the members but kept at the creamery until sold on the society's account to the members or to others. The members bring their milk to the dairy, and payment is made in part each week, in part at the end of the financial year. A part of the profits is allocated to the reserve and another part to the amortisation of the cost of installing the plant, and the remainder is divided among the members in proportion to the quantity of milk which each has supplied. The establishment of dépôts on a co-operative basis for ripening of cheeses is now under contemplation.

At present there are 3,224 co-operative dairies in Italy with 250,000 members (1). The quantity of milk handled in 1929 was 3,878,830 quintals, which provided 399,480 hectolitres of milk for consumption including condensed milk, 289,734 quintals of cheese and 66,781 quintals of butter. The total value of dairy produce sold was 382,562,000 liras, and the factories and machinery are valued at 209,700,000 liras.

The Co-operative Dairy of Soresina, formed in 1900, in the province of Cremona, may be specially mentioned. It is undoubtedly one of the largest butter and cheese-making establishments in Europe. An idea of its importance may be obtained from the following figures: the daily quantity of milk handled has risen in a few years from 100 to 800 and even to 1,200 quintals; its buildings occupy an area of 25,000 square metres, and it has established branches, depots and agencies in the principal markets in Italy and in foreign countries. It has repaid to its members the paid up capital and has brought up the ordinary reserve to over 5 million liras. The Dairy employs a staff of about 250 persons. There are more than 300 members owing in all 10,000 cows. There is a chemical laboratory where the constituents of the milk are analysed and all milk is manipulated according to modern systems with careful observance of all rules of hygiene. It is a distinctive feature of the Soresina Dairy that in addition to butter and various types of cheese it manufactures other special milk products, condensed milk, milk powder, etc.

In the same province special mention may be made of the Casalbuttano dairy which can manipulate nearly 200 quintals of milk per day.

In the province of Reggio Emilia there are 200 co-operative cheese factories, in which is worked about one third of the milk available for transformation, the value of which is over 30 million liras, while the resulting products may be valued at from 45 to 55 million liras. The larger dairies which handle from 5000 to 6000 quintals without counting those which handle 8,000, 10,000 quintals and so on, all have the form of co-operative societies constituted by law; in general the societies legally constituted are the best equipped technically and economically, while among the unregistered societies are found the greater number of small dairies which work on old fashioned methods, and with a small quantity of milk. Among the dairies of the former type the Massenzatico dairy stands out, working from 12 to 14 thousand quintals of milk per annum.

Mention may be made of the movement initiated in 1925 in Sardinia, where 48 dairies were grouped in the Federation of Oristano (Cagliari) with the object of improving technique, facilitating credit, studying the best types of cheese for production, and giving technical and accountancy assistance to the cheese factories affiliated, and providing for the marketing of the products in Italy and in other countries.

The co-operative dairies are grouped under a National Federation, formed in November 1927. Certain provincial organisations may also be noted, such as the Con-

(1) "L'organizzazione economica degli agricoltori". Confederazione Nazionale Fascista Agricoltori. Roma, 1930.

sortium of Agordino, at Belluno; the Consortium of the Cheese Factories and Dairies of the Trentino at Trento, with creameries, a deposit for cheeses, and preparation of by-products; also the Modena Creameries.

The co-operative dairies have undoubtedly contributed in their own areas to the progress of agriculture by encouraging the production of forage crops and the increase of live stock.

(b) *Co-operative Wine-making Societies.*

The co-operative wine-making societies (*cantine sociali*) have for the most part arisen in Italy to meet the crises which have occurred in some years in the marketing of grapes (1). These crises are due sometimes to the abundance of the grapes, sometimes to difficulties connected with consumption and export, sometimes to both causes acting simultaneously. But independently of any such cause of their first appearance, their diffusion has been largely due to the conviction of the vine growers that through these societies it became much easier to produce good wines of keeping quality and of a uniform type, and to dispose of it on more favourable terms. It is well known that the co-operative wine-making society made practicable utilisation, with maximum return, of the most modern technical methods, the application of the principles of enological science and the engagement of expert enologists and specialised staff, all benefits that the individual grower can rarely obtain for himself; it is also known that preparation of wine in large quantities and with modern methods — which is exactly what the wine-making societies do — made it possible to obtain higher percentages of alcohol and a larger yield with the same quality and quantity of grapes as were previously used by the individual wine-makers.

The co-operative wine-making societies, which usually take the form of a co-operative society with limited liability, generally obtain on credit the funds they require for their plant (premises, machines, utensils, etc.). It should be noted here that the Committee for Agricultural Credit, under the Ministry of Agriculture and Forests, adopted, at the meeting of 13 December 1929, the principle that the co-operative wine-making societies and the establishments for the utilisation of wine-making residues are to be considered as on a par with improvement works, and that accordingly towards costs of construction and equipping of these organisations improvement credit should be granted, the State contributing towards the interest at the rate of 2 $\frac{1}{2}$ per cent., or, if the societies are within the territories of land improvement provided for by special laws (such as Ferrara, Modena, Rovigo, Bologna, Ravenna), even of 3 $\frac{1}{2}$ per cent.

The members contract to deliver each year to the society a certain quantity of grapes, the quantity being so calculated that the total quantity which the members have contracted to deliver will be sufficient to ensure the regular working of the society. The price paid to members is determined on the basis of the returns from sales of wine, after deduction of the cost of manufacture, the interest on the capital borrowed for equipment and working expenses, the charges for depreciation, the sums allotted to the reserve fund, etc. It varies in accordance with the quality, the sugar content and the ripeness of the grapes delivered. A payment is usually made on account soon after the wine has been made, that is to say, towards the end of the calendar year, and the balance is paid when the wine of the year has been sold, and

(1) 'Avv. Gino FRIEDMANN: Scopi, funzionamento e importanza delle cantine sociali in Italia. Federazione Nazionale delle Cantine Sociali. Modena, 1929. — Antonio MAROZZI: I compiti delle cantine sociali. Federazione Nazionale delle Cantine Sociali. Modena, 1929.

in any case before the close of the financial year of the society. Out of the price of the grapes is kept back a proportion for amortisation and expenditure on the plant, which is higher in the years of abundant vintages, and lower when the yields are more scanty. A delicate point is that of the system of entering this proportion in the books. Many societies enter it on an account apart from the general book-keeping and at the same time in the special pass books of the members. Thus, as the amortisation proceeds gradually each member comes to have entered in his pass book shares kept back in proportion to the value of the grapes annually delivered to the society, the total representing the extent of his participation in its activities. So as to compensate the original members for the sacrifice occasioned by these annual deductions, some societies arrange to pay a small rate of interest on them. In the rules of the societies of more recent formation a provision has been introduced in accordance with which the right of taking part in the activities of the society may, in the event of withdrawal of a member, be transferred to another member.

From time to time the wine-making societies have succeeded in making remunerative certain areas of vine cultivation which had formerly been little known, by pointing out the defects of certain kinds of vine and advocating their replacement by grafting other kinds. There are also societies which supply products for industry and commerce, such as concentrated musts, filtrates, special effervescing wines, typical wines, etc.: experiments have also been made in the utilisation of selected ferments. Speaking generally, the societies ensure to growers higher prices than those ruling on the market, thus removing anxiety as to marketing.

There are about one hundred co-operative wine-making societies, representing fully 10,000 families of vine-growers and handling in the year an average of about 150,000 metric tons of grapes with a production of more than a million hectolitres of wine.

The following figures relate to the vintage of 1928:

Wine-making societies in full working	84
Members	10,732
Total capacity of wine casks hl.	1,200,000
Grapes made into wine quintals	1,400,000
Production of wine hl.	1,000,000
Aggregate value of the buildings and plant of the societies Liras	70,000,000

In 1929 there were 96 societies handling about 900,000 quintals of grapes. The decrease in comparison with 1928 is due to a great extent to the smaller yield of grapes resulting from the effects of the cold winter of 1928-29 on the vines. In some tracts of the lower and middle Po Valley, Mantua, Reggio, Modena, Bologna and part of Romagna, the cold was intense and there was great destruction of property in vineyards.

The wine-making societies of Modena are especially well organised (1); there are 24 in the province with a total average annual production of 300,000 hecto-

(1) Dott. Italo Po: *Le cantine sociali in Italia*. Federazione Nazionale delle Cantine Sociali. Modena, 1928.

litres, and a capacity of about 500,000 hectolitres. The Nonantola society has a membership of 180, a capacity of 55,000 hl., and a modern plant for preparation and selection of the ferments intended for the making of must; the Sorbara society has 139 members, a capacity of 40,000 hectolitres and owns a warehouse where 250,000 bottles can be kept.

In Oltrepò Pavese the *Federazione delle Cantine Sociali di Stradella* may be mentioned, formed from the societies of Montubeccaria with 385 members, of San Damiano al Colle with 285 members and of Montescano with 207 members. This Federation has 29 branches and sells directly to consumers more than 3,000 hectolitres of wine per month. It has established a distillery so as to collect the residues from the societies belonging to the Federation and the same from the members so far as they make wine from their own grapes. The Federation is equipped for the export trade.

The wine-making societies are affiliated to a National Federation with headquarters at Modena which watches over their interests, and carries on an active propaganda for the progress of vine-growing in general. On the initiative of the Federation a great establishment has been set up for the treatment of the wine-making residues of the societies (1). Some societies provide also for utilising the bye-products of wine-making, extraction of cream of tartar and of oil from grape seeds, extraction of alcohol, manufacture of cattle cakes, and of various kinds of fuel.

Two recent measures will probably give a new impulse to the wine-making societies; by the first (the Law of 27 December 1930, No. 1726), the advisability is recognised of encouraging the formation of co-operative societies for the manipulation and sale of farm products, and in view of the great difficulties which their promoters will encounter is that of acquiring of suitable sites, the expropriation of lands for the purpose is authorised under given conditions. In the second measure (Law of 6 January 1931, No. 22) the State has set aside a fund of 15 million liras for promoting in the larger wine-growing centres which are not fully equipped, the formation of wine-making societies (*cantine sociali*) and of wine selling undertakings (*enopolii*), and for encouraging the enlargement, better equipment and more complete organisation of production and marketing of the output of the existing wine-growing and selling societies.

(c) *Co-operative Superphosphate Factories.*

The supply of superphosphates represents an important part of the business, as has been stated, of the agricultural consortia. All the consortia act as organs for the distribution of phosphatic fertilisers to growers, but the larger consortia have established, especially in Northern Italy, as a direct branch of their business or in the form of auxiliary societies, co-operative superphosphate factories, of which there are now 18. These can produce over 3,500,000 quintals of superphosphate, more than one-fifth, that is, of the maximum production so far reached in Italy, while they sell about one-fourth of the average quantity of the product consumed in the country. They take the form of societies with limited liability but with no restrictions on the issue of capital and usually sell to the farmers through the medium of local agricultural societies. Their members have the right to be supplied with a quantity of superphosphate proportionate to the number of shares held by them. In some of these societies this right has been converted into an obligation, subject

(1) Arturo MARESCALCHI: Sulla utilizzazione dei sottoprodotti della vinificazione. Federazione Nazionale delle Cantine Sociali. Modena, 1929.

to special rules. The following figures (1) may be quoted as referring to these factories :

Factories —	Year of foundation or of transfer to a co-oper- ative society —	Capacity (cubic metres) —	Productive capacity (quint.) —
Piedmont :			
Fossano	1921	3,140	110,000
Novara	1917	4,064	160,000
Vercelli	1903	11,500	500,000
Lombardy :			
Bagnolo Mella	1897	7,000	180,000
Casteggio	1921	2,765	125,000
Cremona	1906	3,300	165,000
Mantoua	1903	5,160	220,000
Melegnano	1900	1,640	40,000
Milan	1908	3,085	90,000
Secugnago	1911	5,489	210,000
Soresina	1921	3,600	170,000
Venetia :			
Cerea	1908	2,663	130,000
Montebelluna	1907	4,153	180,000
Portogruaro	1904	7,600	450,000
Emilia :			
Piacenza	1907	7,571	300,000
Ravenna	1921	3,727	220,000
Marches :			
S. Elpidio	1911	6,790	340,000
Campania :			
Cancello (Naples) 1930	1930	—	—
Total			3,600,000

(1) DI STASO Arcangelo : Le fabbriche di perfosfato degli agricoltori. Federazione Italiana dei Consorzi Agrari. Piacenza, 1928.

The Canello Factory, which is the most recent, has been promoted by the Co-operative Provincial Agricultural Consortium at Naples with the support of the agricultural consortia of Avellino, Benevento and Campobasso and with the participation of the Italian Federation of Agricultural Consortia and of the "Italia" Natural Fertilisers' Company. The plant is as complete and modern as possible. The superphosphate produced is assigned exclusively to the co-operative societies which are members of the consortium, in proportion to the respective shares in the capital. The factory is built at Canello, an important railway and road junction, at about 20 km. from Naples, in the centre of a zone intensely cultivated. It is thus in a very convenient situation for the neighbouring provinces to which the superphosphate can be despatched either by rail or road with the greatest economy of transport. The capital invested in the factory amounts to 2,650,000 liras.

Some of the factories of this kind are as fully equipped as the best factories of the ordinary manufacturers. They obtain raw materials, including phosphorites from the countries of North Africa. They have always succeeded in selling superphosphate at lower prices than the prices at which the large manufacturers are able to sell. They represent a means of control of production costs. It may be reckoned that the capital invested in the co-operative factories amounts to over 50 million liras.

[(d) *Co-operative Cocoon-drying Societies.*

These represent a form of co-operation which is very generally diffused and which originated in the necessity felt by the silkworm rearers of freeing themselves from the *ammassatori*, middlemen who taking advantage of their need of cash at the moment of gathering of cocoons used to offer entirely inadequate prices which they were obliged from force of circumstances to accept. The cocoons, as is well known, are so delicate a product that if the breeder has no plant for drying and preserving them, he is obliged to sell them immediately and thus is usually unable to sell them to advantage. The cocoon-drying societies arrange for collecting, drying, and preserving cocoons, and for selling them at the most advantageous moment. They obtain from local credit institutions the means for making advances to the members on the produce deposited. The working expenses and the returns from the sales are divided amongst the members in proportion to the cocoons delivered.

The work done by these societies is of great utility in the present conditions of the national silkworm breeding and sericulture. The production of cocoons in Italy has shown in the last fifty years a slow and continuous decline, passing from 60 million kilogrammes per annum to an average of 51 to 52 million kg. and only during the last few years has there been a revival, as the result of many combined efforts, including those of the National Fascist Confederation of Farmers. Since this production is not adequate to the present capacity for absorption of the national silk industry, which can utilise from 70 to 75 million kilogrammes of cocoons, it is important to encourage the industry and to endeavour to ensure a remunerative price to silkworm breeders. Such is the essential object of the cocoon-drying societies, the number of which on July 1930 was 120, with a quantity of over 7 million kilogrammes in comparison with 4 million in the season of 1929. The distribution of the societies is as follows: the three Venetian provinces, 70; Lombardy, 16; Calabria, 9; Tuscany, 7; Emilia, 6; Umbria, 4; Marches, 3; Sicily, 2; Campania, 1; Tripoli, 1; Piedmont 1.

The movement is very flourishing at Friuli (1). Here the cocoon driers are legally constituted in the form of co-operative societies with limited liability. Almost all have made provision for co-operative plant with premises of their own, and with an expenditure varying on the average between 400,000 and 600,000 liras each. For purchase of buildings and machines funds have been raised by means of loans, as in general the capital of the society would be insufficient. In 1929 the 19 cocoon-drying societies existing collected about 1,900,000 kg. of cocoons or nearly half of the local production.

For the advances which have to be made to the members each year on the cocoons delivered, the advance being from one-half to two-thirds of their current value at the time of collection, from 15 to 20 or 25 million liras are required each year. This sum is placed at the disposal of the societies by the Bank of Italy and by the Federal Agricultural Credit Institute for the Three Venetias. The societies have lately dealt with the problem of the purchase and distribution of silkworm seed, of first importance to them as sales of cocoons are made *a resa*, that is, according to their actual value, and hence the societies cannot but be concerned with the quality of the silkworm seed obtained by their members. With the object of reducing the cost of production, an endeavour is being made to set up direct relations between the establishments supplying the seed and the silkworm breeders.

In the Trentino at the end of 1929 there were 18 cocoon-drying societies with 10,934 members, and plant valued at about 2,698,000 liras. The 18 societies possess 32 ovens with a total capacity of 140,000 kg. per 24 hours. The aggregate quantity of cocoons delivered was as follows in the last few years :

1920	. . . . .	kg. 381,530
1925	. . . . .	» 699,137
1926	. . . . .	» 541,959
1927	. . . . .	» 816,974
1928	. . . . .	» 687,723
1929	. . . . .	» 724,286

Since the yearly average production of cocoons in the Trentino has been since the war less than one million and a half kilogrammes, the quantity handled by the societies is about half of the product of the region.

In April 1930 a national federation was formed to supervise the societies and to give them assistance in technical matters and in questions of management.

(e) *Co-operative Societies for the Sale of Fruit and Vegetables.*

In several regions an interesting movement is springing up for the co-operative marketing of fruit and vegetables. The small grower and even the average grower is not able, owing to the limited quantities grown, individually to market his pro-

(1) Dott. Giovanni PANIZZI: Gli essiccatoi cooperativi di bozzoli del Friuli nel primo quinquennio di vita. Federazione Agricola del Friuli. Commissione per gli essiccatoi cooperativi bozzoli. Udine, 1927. — Do.: Essiccatoi cooperativi bozzoli nel Friuli. *Giornale di Agricoltura della Domenica*, N° 45, Piacenza, 4 November 1928.

duce to advantage. As produce of this kind is rapidly perishable, growers usually ended by accepting absurdly low prices from the higglers. In consequence the growers felt the necessity of organising themselves, all the more so as fruit and vegetables are largely exported, and it was clearly only by organisation that the serious difficulties connected with the export trade could be overcome. The first co-operative societies for the sale of fruit and vegetables were those of Cesena and Pedaso (1905) and of Iesi (1907). At Massalombarda, which is well known for the growing of peaches, the Co-operative Society of Fruitgrowers began operations in 1921; it quickly attained a remarkable development and is conducted on the most approved technical lines. With a view to improving the sales organisation the Cesena and Massalombarda societies decided to join forces, and to extend the system already initiated of sending responsible agents to other countries with definite functions. These agents are expected to see that sales proceed rapidly, to inform the consigning society every day of the returns obtained and of the course and forecasts of the market. They should also suggest improvements in packing, in the method of exhibiting the product and of loading the trucks and should advise as to the type and quality of products preferred by the consumers, and should explore new trade channels and contacts.

This first nucleus of a federation was joined later by the Imola agricultural consortium which is especially interested in the tomato export, by the Lugo Co-operative Society, the Bologna Agricultural Consortium and the Iesi Co-operative Society for the Export of Agricultural Produce. In April 1926, under the auspices of the Italian Federation of Agricultural Consortia, there was formed among the societies enumerated an unregistered society to remain in existence for one year only, called the Agricultural Federation of Italian Co-operative Societies for Exportation. This organisation immediately initiated a systematic scheme of trade expansion together with a study of the markets and of the most rapid and cheapest means of communication. In the 1926 season, the co-operative societies of Massalombarda, Iesi, Imola, Cesena, Lugo and Caltagirone sold on the consumers' markets of Germany and Switzerland 866 trucks of goods for a sum of liras 7,763,499. The movement was however destined to attain even greater development from the formation in 1927 of the Section for the Co-operative Marketing of Agricultural Produce, by the Italian Federation of Agricultural Consortia, largely as the result of the interest taken by the Farmers' National Fascist Confederation (*Confederazione Nazionale Fascista degli Agricoltori*). The Federation active in the formation of this Section included also the Consandolo and the Ravenna Fruit and Vegetable Growers' Co-operative Societies. The fundamental principle on which the organisation of collective marketing turns at the present day is that of separating the trading activities proper from the other functions of the co-operative societies. It is intended that the commercial organisation, with a view to the systematic regulation of the distribution of goods to the centres of consumption, shall be uniform for all the societies of the kind and entrusted to their federation; the separate societies, that is to say, should confine themselves to supervising the local production, making regulations for the members and attending to the technique of the gathering and handling of the produce, with uniformity of method and on lines indicated by the federation itself (1).

The Section, the headquarters of which is at Bologna, groups 49 co-operative societies and has instituted offices and centres for forwarding at Munich, Basel,

(1) REAO POLUZZI: L'esportazione cooperativa dei prodotti orto-frutticoli. *L'Italia Agricola*, N° 12. Piacenza, 1927. — MARCHI Vittorio: Cooperazione ed orto-frutticoltura. Federazione Italiana dei Consorzi Agrari. Piacenza, 1928.

Frankfort and London, marketing a total of 73,384 quintals of produce for a total value of 7,264,000 liras in 1927: in 1928 it marketed, up to 28 October, 1854 truckloads and 991 combined consignments, for 15 million liras.

About 150 co-operative fruit and vegetable societies may be reckoned as existing in Italy at the present time, and will derive much benefit from the large establishment for pre-cooling of vegetables and fruit intended for export, constructed in 1930 at Verona, an important railway centre. These premises are so equipped that 400 truckloads of fruit can be warehoused and eighty despatched every 24 hours.

6. CO-OPERATIVE LABOUR SOCIETIES.

These societies are formed among workers, especially navvies and labourers in the building trades, primarily with the object of freeing the workers from dependence on the ordinary contractors and of directly undertaking contracts for public works, such as construction and maintenance of roads, bridges and canals, drainage, reclamation, irrigation, land improvement, etc. Special laws were passed in their favour and they rapidly increased in number. The maximum value of contracts which may be given by tender or by private treaty to co-operative societies for production and labour, according to the Decree of 8 February 1923, No. 422, is 1,000,000 liras; but legally constituted societies may also combine in consortia to tender for larger contracts and to undertake in any part of the Kingdom to carry out public works for the State, for provinces, for communes, or for corporate bodies. The maximum value of the contracts for public works which may be given to such consortia may not exceed, according to the Decree just referred to, the sum of 5,000,000 liras, except in cases in which the Government, on the advice of the Higher Council of Public Works, is satisfied that they offer sufficient guarantees from both the technical and the financial point of view.

The co-operative labour societies, in order to be able to tender for public contracts, must apply for and obtain inscription in special registers kept at the prefectures. As a guarantee for the proper execution of the work, 5 per cent. of every instalment of payment that becomes due to them is withheld and is only paid to the societies when the work is completed and approved. Inscription in the special registers renders the societies subject to government supervision, which is exercised through provincial commissions attached to each prefecture. The consortia, which are established by Royal Decree, become corporate bodies, and are subject to the rules of the Commercial Code in regard to all their commercial transactions and all matters arising out of them; they enjoy the same fiscal privileges that are conceded to the individual co-operative societies. They are subject to the supervision of the Ministry of Corporations which does not allow them to be formed unless they are provided with adequate financial means and are so organised as to give assurance that they will be able usefully to exercise their functions. They generally undertake the more important works and arrange that these shall be carried out by the component societies, to which they give assistance in technical matters, in management and in accountancy. They also negotiate for them the necessary loans.

In March 1930 there were 20 consortia in existence, the most active being those of Bologna, Modena, Ravenna, Reggio Emilia, Udine, Grosseto and Milan. As to the co-operative societies undertaking public contracts, according to a recent statement made by the Ministry of Corporations (1), the total number of those inscribed in the special registers on 31 December 1929 was 1,301 and their membership

(1) *Bolettino del Lavoro e della Previdenza Sociale*, n. 1-2-3. Rome, 1st January-31 March 1930-VIII.

amounted to 105,453. The greater number occur in Emilia, there being 356 societies with 46,269 members, and after that in Venetia (189 with 16,464 members), in Tuscany (124 with 11,564 members) and in Lombardy (102 societies with 5,713 members).

The co-operative societies for production and labour are grouped into a National Federation, subordinate to the National Institute of Co-operation. Of special interest in relation to agriculture are the co-operative societies formed by navvies and specialising in road-making and land improvement. They will doubtless have an important part to play in the great plan laid down by the Government (1) for the comprehensive improvement of land (*bonifica integrale*) (by the Law of 24 December 1928, No. 3,134) and for home migration and colonisation. In this field there are notable instances of co-operative activity, of which some examples may be quoted here.

The Consortium among co-operative societies for production and labour at Reggio Emilia has carried out for the land improvement in the province of Parma works to the annual value of from 8 to 10 million liras which at times have given employment to as many as 2,000 workmen. The Consortium of the province of Modena which was formed in 1915, and includes 40 co-operative societies, has a wide experience in land improvement operations. In 1929 it accomplished works of the value of 13,402,000 liras. At the present time several hundred member workmen are engaged in the execution of public works entrusted to the consortium at a total value of about 20 million liras. In Tuscany the Consortium "Maremma" is formed among co-operative societies for production and labour, at Grosseto; it began work in 1921 and has two sections: the labour and the agricultural section. The Labour Section is equipped to undertake building construction and land works, which the Section either executes on its own account, employing the labour elements of the co-operative societies, or transfers to the societies themselves. The object of the Agricultural Section is carry out land improvement and cultivation, employing the farm labour which can be supplied from the societies. From 1926 the Section took the lease of an estate containing about 900 hectares, which it is radically transforming. About ten kilometres of ditches and canals have been dug for drainage and collection of water, fences have been made, wells have been sunk, and shelters erected for men, live stock, machines and implements. When the work of improvement and transformation was accomplished, cultivation was undertaken.

Another notable example is that of the Milanese Co-operative Society for Production and Labour, which is reclaiming a part of the lower basin of the Sele, in the province of Salerno, a marshy and malaria-stricken district which is now well on the way to being rendered completely healthy. The society has erected a village of huts, partly in masonry and partly in wood, intended for lodging the workmen, with special sheds for deposit of materials and tools. It is at present arranging for the construction of a great embankment and for the digging of a broad canal and for the pushing on of all the work of excavation and levelling of the land along which the water is to flow. A special building is put up for the surveyors, engineers and technicians whose business it is to ascertain all the characteristic features of the area so as facilitate the accomplishment of the work. In less than one year work to the value of nearly 6,000,000 liras has been carried out by more than 400 workers. The land drainage reclamation work will be supplemented, at a favourable time and side by side with the subsidiary work to be accomplished, by the complete work of land transformation in the full sense.

(1) See also *International Review of Agriculture (Part II)*, No. 4, Rome, April 1929.

The Labour Society of Ravenna Men Resident at Ostia and Fiumicino, a co-operative society with limited liability, also belongs to this group. It has been in existence for 56 years, in addition to other work accomplished for the State and for other public and private organisations, it carried out the historic reclamation of the lands of Ostia, Maccarese, Isola Sacra, and Camposalino in the Roman Campagna, covering an area of 70,000 hectares (1).

From statistics compiled by the National Institute of Co-operation it appears that the co-operative labour societies carried out in 1927 building works of various kinds to the value of 182,089,089 liras, reclamation works to the value of 45,459,436 liras, and work of road upkeep to the value of 11,311,449 liras.

7. COLLECTIVE LAND-HOLDING SOCIETIES.

As has been seen, in the co-operative labour societies engaged in work of an agricultural character, the workers carry out works which may be described as preparing the land for cultivation. It is comparatively simple work, although essential, and it involves very little risk. The co-operative land-holding societies (*affittanze collettive*), a form of co-operation which originated in Italy, are associations of workers formed with a view to obtain land for cultivation. They undertake farming operations, assuming all the risks involved therein. They obtain land in most cases by taking it on a cash tenancy, but in some cases they take it on a share tenancy (*mezzadria, terzeria*, etc.), or even purchase it. Thus we may speak of collective cash tenancies, collective share tenancies and collective ownership. But the name of collective land-holding is more usually assigned to the society which undertakes the management of the farm without reference to the particular form of agreement on which the lands have been obtained.

According to the system of farming the land, the land-holding societies are divided into societies with collective management and societies with individual management. In the first case the land is administered and farmed directly by an association of agricultural workers as an undivided unit. The private capitalist farmer is replaced by the society which has undertaken the farming enterprise; this society decides how the land shall be utilised, and how the fixed and circulating capital shall be employed; it engages regular workers, paid by the year, to look after the live stock and work the farm machines, as well as casual workers, paid by the day or by the hour, or even in some types of cultivation, receiving a share of the produce, for the other work of the farm. The only difference from an ordinary privately owned farm is that the workers, regular or casual, are chosen from amongst the members. As member, the farm worker has a right to a share in the nett profits of the undertaking; as worker on the farm he has only a right to the wages or share of produce as stipulated. The society provides for the management and direction of the farm through its own executive bodies (Council, Presidential Bureau); frequently also by means of a specially engaged staff (farm manager, farm book-keeper) paid according to a special agreement. If an association has rented more than one farm someone is put in charge of each to direct and supervise the work.

In the other type of land-holding societies *i. e.* with individual management, the society merely takes large blocks of land from the owners and distributes them in small lots among the members. This form is chiefly developed in Sicily,

(1) Cristiano FOCARILE: I Romagnoli ad Ostia. Libreria del Littorio, Rome, 1928.

and in Lombardy (in the Provinces of Milan and Bergamo. In these cases the members aim at obtaining sufficient land to provide work for the family unit ; they hand over to the society a part of the produce obtained from the land or they pay the society an annual rent proportionate to the rent paid by it to the landowner. For the most part they carry out directly all the work which is necessary for securing the crop, but in recent years a tendency has been noticeable to execute jointly some more costly operations, such as motor-ploughing and threshing. The societies also purchase chemical fertilisers and distribute them amongst the members in accordance with their requirements, against payment in cash or on credit.

The members of the land-holding societies with collective management are day labourers ; in the societies with individual management they are either labourers, small holders or share tenants. The land is taken on agreements for periods varying from a minimum of one year, in the case of joint share tenancies, to three, nine, fifteen years, etc., and the lands so taken on joint agreement are either the property of the State, or of charitable institutions or other corporate bodies or of individuals. Besides farming the land, the co-operative land-holding societies usually exercise other functions for the benefit of their members, such as purchase of requisites and sale of produce, joint use of farm machines, manufacture of butter or cheese, mutual insurance of live stock. In respect of agricultural credit they act either as intermediary bodies of the institutions to which is delegated by law the exercise of credit functions, or as independent deposit and loan banks. They also exercise functions of a social character.

These societies have however serious problems to meet and difficulties to overcome which are by no means trifling. Composed as they are of workers of a humble class and usually without means, they are obliged to have recourse largely to credit to obtain most of the sums needed for the taking up and managing of farms ; and even a partial crisis is enough to create embarrassment in the regular activity. Their financing can be arranged by any of the credit institutions functioning in the localities of their headquarters ; ordinary savings banks, popular banks, agricultural banks, etc. It may be noted that the necessity for organising a credit service adequate to the special conditions and requirements of this type of associations induced the Government to establish at the National Institute of Credit for Co-operation, now the National Bank of Labour, a Section of Agricultural and Mortgage Credit (Decree-Law 22 April 1920, No. 516) with the function of exercising credit in favour of associations of agricultural workers legally constituted in corporate bodies and under form of co-operative societies which are owners or tenants of land or have obtained joint possession of lands. This Section was a kind of Bank for the associations of peasant farmers, and was empowered to exercise the three types of credit : mortgage credit, improvement credit and credit for working capital. The present National Bank of Labour and its autonomous Section of Mortgage Credit exercise in part, in respect of the co-operative land-holding societies, the functions entrusted to this special organ.

No small difficulty also attends the securing of lands for cultivation by the land-holding societies. They have been obtained, for the most part from private persons, and in recent years, from charitable institutions. Provision was made by the Decree Law of 4 August 1918, No. 1,218, for the letting of public lands to the co-operative societies, the administrations of the provinces, communes and public charitable institutions being empowered, subject to previous authorisation by the prefects, to let lands belonging to them by treaty to co-operative land-holding soci-

eties. In addition when such administrations have decided to adopt the system of public auction preference must be given to the co-operative societies, if bidding is equal. Undoubtedly such provision encouraged in certain provinces agreements for the letting of lands between public bodies and co-operative land-holding societies. New and great possibilities were however opened to the societies by the scheme for the comprehensive land improvement of the national territory referred to above ; it is in fact considered to be advisable to entrust the execution of land improvement in a strict sense to the co-operative labour societies, making the co-operative land-holding societies, as well as other bodies, responsible only for the subsequent cultivation of the improved lands.

Another question of capital importance for this type of co-operative society is that of technical and administrative assistance. For systematic farming the work of a technical manager is in fact indispensable ; so also is that of a book-keeper secretary who will make clear the position of the undertaking and suggest means whereby it may draw profit from the farming or the marketing conditions. The separate co-operative societies are not always in a position to form appropriate technical and administrative bodies, which often entail disproportionately heavy expenses. Hence comes the necessity for grouping the co-operative societies of every province in groups for the joint provision of such technical and administrative services as the associations could not singly set up. Thus have arisen various provincial federations or unions and in 1930 a National Federation of the Co-operative Societies of Agricultural Workers (Rome) in which are grouped not only the societies having as object the farming of lands rented or owned, but also those for the execution of farm work or land operations. More than 400 co-operative societies of this type belong to the Federation.

According to an enquiry made by the National Institute of Co-operation (1), there were 314 co-operative farming societies at the end of 1928 distributed as follows : Lombardy 124, Emilia 73, Sicily 34, Veneto 24, Umbria and Latium 23, Piedmont 12, Campania 10, Tuscany 9, the Julian Venetia 3, Apulia 2. Membership amounted to 46,724; share capital and reserves to 30,282,097 liras ; the value of the live stock to 37,211,090 liras and that of the buildings, machines and implements to 41,128,315 liras. The societies were cultivating 63,674 hectares of land that was their own property and 178,938 hectares of rented land. The aggregate annual rent of the rented lands amounted to 2,961,220 liras, and the price paid for the lands purchased to 62,487,868 liras. The aggregate production in 1927 amounted to 133,198,937 liras. The advances obtained from the National Bank of Labour stood in 1928 at the sum of 30,993,672 liras, and those obtained from other banks to 25,880,749 liras.

Co-operative societies of this type are especially numerous and well organised in Emilia, and particularly in the province of Ravenna, where they originated in the attempt to find an effective remedy for agricultural unemployment, due to the excessive number of farm labourers and not relieved by emigration. In this province the societies were grouped under the Federation of Co-operative Societies in Ravenna, to which on 31 December 1929, there were 20 societies affiliated, cultivating 3,790 hectares of owned land and 5,317 of rented land, making a total of over 9,000 hectares. The following statement of their position may be of interest.

(1) " *Efficienza del movimento cooperativo italiano aderente all'Ente Nazionale della Cooperazione* ". Roma, November 1928-VII.

Assets.

	Liras
Land and buildings, rural	22,232,279.86
Land and buildings, urban	1,920,020.55
Live stock	2,767,214.00
Machines, implements, etc.	3,679,361.30
Stocks in store	2,916,924.32
Unexhausted cultivation values	6,942,617.74
Balances on current account with the Federation	11,749,361.01
Due from administrations with which contracts have been made	2,275,166.37
Sundry assets	4,544,606.36
Total assets	59,027,551.53
Losses	10,550.39
	59,038,101.92

Liabilities.

	Liras
Loans	11,490,346.07
Bills	15,066,100.00
Over drafts from Credit Institutes	2,425,255.62
Overdrafts from Federation	11,311,448.19
Sundry liabilities	6,920,589.57
Sundry creditors	3,797,223.76
Share capital	4,918,750.21
Reserves	2,749,661.43
Total liabilities	58,679,374.85
Profits	358,749.07
	59,038,123.92

From the above statement it results that the aggregate net owned capital of the societies at the end of 1929 was 8,016,610.32 liras, composed as follows :

	Liras
Share capital	4,918,750.21
Reserve funds	2,749,661.43
Net profits in 1929	348,198.68
Total	8,016,610.32

To this should be added the large reserve consisting in the low value assigned to the assets and in particular to the lands, which for a total of 4,690 hectares are shown the statement as 22,232,279 liras, or 4,740 liras per hectare.

In 1929 the Federation obtained a profit of 168,925 liras from the farms, 3,255 hectares in area, which it owns and directly manages, in spite of the fact that the year was an unfavourable one on account of the fall in prices and the drought that seriously affected the beet and forage crops.

Some special note may be made of the figures relating to the separate crops. From the 2,015 hectares under wheat cultivation a production of 45,789 quintals was obtained, equivalent to an average yield of more than 22 quintals the hectare, the highest in the province. The beetroot crop was reduced by drought to 297,033 quintals on an area of 1,242 hectares with an average yield of 239 quintals per hectare. This reduction was in part only compensated by the high sugar content: there was in fact an aggregate of 5,357,898 polarimetric degrees which, paid on the basis of 0.75 liras per degree, gives a sum of 4,018,423 liras with an average of 3,235 liras per hectare. The cultivation of tomatoes is also important, the production amounting to 26,000 quintals with 110 hectares of land under cultivation.

Allusion must also be made to the social aspect of the work of the co-operative land holding societies, in order that their character may be more fully understood. It suffices to mention that the Federation in 1929 set in order, as from July 1920, the labour records of all the members having the right to inscription in the National Social Insurance Fund (*Cassa Nazionale per le Assicurazioni Sociali*) and regulated their position in relation to social insurance. In doing so it incurred charges amounting to about half a million liras. It has thus been possible to assure to about a thousand workers who are members of the societies, pensions varying from 600 to 800 liras per annum, payable at the age of 65, and moreover to regulate the position of all members of the co-operative societies so that they from now can have the benefit of the pension for disablement and old age, care in the case of tuberculosis for themselves and members of their family, and compensation for accidents in work.

In the same region, in the province of Reggio, the agricultural co-operative society of S. Vittoria has been working since 1889 with a membership of over 900 members. This society farms about 865 hectares, 285 on a profit sharing basis, 225 on a cash tenancy and the remainder in ownership.

In Lombardy, in the province of Bergamo, it has been recently decided, in respect of the co-operative landholding societies, to ensure to them careful technical management, to maintain on the farms the best type of farming families, to give attention to the systematic division into holdings of the lands, while avoiding the undue splitting up of areas which is prejudicial to remunerative cultivation, every family having to work a parcel of land sufficient for itself and in proportion to the labouring strength. A typical example is given by the Agricultural Co-operative Society of

Calvenzano, which has been in existence for 42 years, owns 155 hectares and rents on a cash basis 100 hectares.

In Latium special note may be made of the "Agricultural Co-operative Society formed among farm families from Ravenna living at Ostia" founded in 1915, an offshoot of the Co-operative Society of Ravenna Men Resident at Ostia and Fiumicino of which mention has been made in an earlier paragraph. It farms in emphyteusis the public lands of Ostia (650 hectares), on which are grown wheat, barley, oats, watermelons, vegetables and sugar beet. The harvest of 1928-29 yielded 5,000 quintals of cereals. The average yield in wheat has been 18 quintals per hectare, much higher than that of the region as a whole. A scheme of splitting up the estate into small holdings is under contemplation and will make possible the placing of a number of farm families.

The co-operative landholding societies in Sicily are of relatively early date, and originated in the necessity for eliminating the *gabellotto* or individual renting land as a speculation. Here the type of society is that with individual management. Their development was promoted by the Agricultural Credit Section of the Bank of Sicily which in 1928 included, as its intermediary bodies, 39 co-operative land-holding societies which rented 62 farms in all, the total area being 18,614 hectares (1). The agricultural co-operative society of Cammarata, in the province of Agrigento, has been in existence for 16 years and has a membership of 824, with a guarantee capital of nearly 16 million liras, a turnover of about 7 millions and a reserve fund of 400,000 liras. It owns an estate for which a complete scheme of splitting up into holdings has been prepared with a view to changes in the system of cultivation, and the technical management has also been ensured. In order that the members may not be obliged, so as to meet their engagements, to sell products at the time of the harvest at unremunerative prices, arrangements have been made for the construction of a large co-operative store of 6,000 quintals of wheat in capacity.

The "Colaïanni" Agricultural Co-operative Society of Menfi (Agrigento) has a membership of 600 persons who have become small cultivating owners as the result of splitting up a latifundium, paid for in the course of 10 years at more than one million liras.

The "Casalini" Co-operative Society of Centuripe (Enna) has recently bought an estate of 847 hectares for the price of 1,700,000 liras, paid from its own funds, with advances paid by the members purchasing and with a loan of 700,000 liras obtained from the Bank of Sicily. It has been subdivided into 86 lots, and assigned to the same number of families of farmer members. The "Combattente" Co-operative Society of Francofonte (Syracuse) which was founded in 1919 has made provision for the transformation and subdivision of the Ragameli estate, assigned to the society by the National Institute of Ex-Service Men (*Opera Nazionale dei Combattenti*) for the price of 1,414,000 liras, payable in eight annual instalments. To fulfil the obligations assumed in respect of this Institute, the estate was divided into 1,037 lots: the typical plot of land is of the value of 1,412 liras and 63 ares in extent. Provision was made for a speedy carrying out of certain agricultural improvements: roads of approach were cut, cheap dwelling houses erected, torrents were regulated, canals dug and large numbers of fruit trees were planted. In consequence of the improvements executed, the average present value of the plots varies between 18 and 20 thousand liras and some reached 100,000 liras, so that the

(1) "Notizie sull'economia siciliana. Anno 1928-VII". Banco di Sicilia. Osservatorio Economico. Palermo, 1930.

value of the estate amounts to-day to about 20 million liras as compared with a purchase price, according to report, of 1,414,000 liras.

Taken as a whole it may be stated that the co-operative land-holding societies represent an experiment undoubtedly involving economic difficulties but of great social interest. They have in most cases contributed to the solution of problems of land settlement, which it would otherwise have been difficult to handle.

8. AGRICULTURAL MUTUAL INSURANCE SOCIETIES.

Agricultural mutual insurance in Italy has some remote origins in the small rural communes of the Alps where exist societies of mutual insurance against losses of live stock. There are however no general and recent statistics available in this respect. According to the last calculation there were about 1,350 mutual insurance societies in Italy, organised for the most part in the original form, according, that is, to the system of distributing the losses amongst the members, and not grouped in federations.

A group of societies working on a systematic basis and with good results is that of the province of Trento, where there is a Provincial Inspectorate of Mutual Live Stock Insurance Societies. It is understood that insurance societies that wish to benefit by the assistance given by this institution are expected to adopt model rules and to be constituted legally. Their registers are inspected at least once a year by the Inspectorate, which at the close of every year of insurance compiles the balance sheet of the different insurance societies. At the beginning of every half year a Commission of three experts examines the estimates of each society. The members are compensated in all cases of death of stock or of forced slaughtering of the insured animals, in the proportion of 80 per cent. of the insurance value. The compensation extends also to losses caused by epizootic diseases. The Inspectorate acts through a technical adviser of the societies, and by means of representatives of the parties concerned gives judgment in disputes between the societies and members. From the end of the war up to 1929 there were legally founded and legally constituted 200 insurance societies of this type. In 1926-27 compensation payments made were covered to the extent of nearly half by the net return derived by sale of the carcasses, hides, etc. This return is constantly increasing with a corresponding diminution in the net loss due to the deaths, etc., the total loss in 1926-27 being less than 1 per cent. of the assured capital.

The administration expenses varied in the nine years 1918-19 to 1926-27 between a minimum of 0.23 per cent. of the assured capital on the first year to a maximum of 0.25 per cent. of the capital in the ninth year. In that period the maximum average expenditure for the compensation payments and the administration of the societies was 1.56 per cent. of the assured capital (1).

To promote the reorganisation of the former mutual insurance societies and in general to place this type of society on more systematic bases and to encourage their formation there was issued in 1919 the Decree-Law of 2 September, No. 1,759 (modified by the Decree-Law of 21 October 1923, No. 2,479). By this legislation it was enacted that agricultural mutual insurance societies, in order to enjoy the benefits provided by the law, must operate within an area strictly local, must fix the annual amount of the contributions within the limit to be fixed by Royal Decree,

(1) "La mutua assicurazione del bestiame nella provincia di Trento" [Ispettorato] provinciale mutue bestiame. Trento, 1929.

observe the principle of unpaid official services, except in regard to the secretary and the cashier, and must have no speculative object. The societies complying with these requirements obtain legal recognition by decree of the Prefect. The documents constituting the society and these relating to admission and withdrawal of members are exempt from registration and stamp tax; similar exemption is extended to all the documents relating to the operations to be accomplished. All the sums annually assigned to the reserve are exempt from the income-tax (*ricchezza mobile*). The societies regulated by the Decree already mentioned may make provision for reinsurance of their own risks and for the safeguarding of their own interests, by combining in federations or reinsurance societies.

In the first five years of application of these rules there were legally recognised 424 insurance societies, of which 276 were societies for insurance against mortality in livestock, 98 against fire, 42 against mortality in livestock, injury to live stock and thefts of live stock, 6 against losses by hail and two against damage to crops.

At the end of July 1930 the National Federation of Agricultural Mutual Insurance Societies was formed, to which there belong about 600 societies. A comprehensive scheme of reorganisation of the societies is contemplated, to be applied in particular to the live stock societies, for which it appears to be essential and urgently required.

G. COSTANZO.

AGRICULTURAL LEGISLATION

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CHILE. — Decreto número 12. Aprueba el texto definitivo del decreto reglamentario sobre la «mosca de la fruta». — 4 septiembre 1930. — *Diario Oficial*, No. 15782 (26 septiembre 1930).

[This Decree prohibits the importation of all fresh vegetable products, whatever their provenance, which might be the means of introducing fruit fly. All fresh fruits are examined and also vegetables, especially tomatoes, aubergines, pumpkins, French beans and pimentoes.

An exception, is made in favour of fresh fruit coming from California; of bananas, pineapples, coco-nuts "*paltas*" dates, water melons and cucumbers when these are imported from Ecuador, of the above-mentioned fruits and for vegetables coming from Peru and Brazil provided they come from a zone certified by the authorities there to be free from fruit fly; and lastly of fruits coming from the Argentine Republic with the exception of oranges, on the same conditions as mentioned above.

All fruits and other plant products imported shall be accompanied by a health certificate to be attached to the bill of lading, etc. This certificate must receive the visa of the Chilean consul at the port of embarkation.

All maritime and land transport companies, merchants or private persons guilty of breach of the rules of the present decree shall be liable to the penalties specified in art. 12 of the Plant Protection Law].

SPAIN. — Real decreto estipulando las normas a que habrá de ajustarse la exportación de naranjas, mandarinas, toronjas y limones. — 11 octubre 1930. — *Gaceta de Madrid*, No. 285 (12 octubre 1930).

[Exporters must be registered on the official Register kept for the purpose at the Commercial Section of the Ministry of National Economy. Every year, in the month of January, the exporters must prove by means of a certificate delivered by the Chamber of Commerce of their particular district, that they still carry on the same profession.

The registered number shall be reproduced on all packages of citrus fruits exported.

It shall be unlawful to export oranges, tangerines and lemons which are not sufficiently ripe or which are artificially coloured. The fruits must be of excellent quality and must be packed in such a way that they will be in a proper state of preservation at the end of their journey. In certain cases fruit of defective quality may be imported provided they are not meant for the table and provided their nature is clearly indicated on the package. The fruit exported must be of uniform quality, size and maturity.

They shall be submitted before exportation to inspection by the State authorities. A certificate with the visa of the Official Inspection Service shall be delivered and in turn handed over to the customs authorities. A second certificate shall be drawn up by the maritime authorities as evidence that the fruit has been shipped in accordance with the conditions prescribed in the present Decree. The State may delegate this power of inspection to legally constituted associations or syndicates of exporters. Commissions composed of the said Chambers of Commerce and Syndicates shall be responsible for this work of inspection. These Commissions shall deliver the certificates mentioned above, they shall keep in mind information sent by commercial advisers and attachés, etc. in order to control the proper exportation of oranges, tangerines and lemons to foreign markets.

The Minister of National Economy shall have full power to suspend the functions of any Commission whose work is not satisfactory, without prejudice to any penalties it might incur by breach of the laws and regulations in force.

SPAIN. — Real decreto relativo a los requisitos indispensables para poder ejercer la exportación de vinos, licores y bebidas alcohólicas - 23 septiembre 1930 — *Gaceta de Madrid*, No. 269 (26 septiembre 1930)

[On and from 1 November 1930, all persons wishing to export wines, liquors and alcoholic beverages must be registered on the official Register created for this purpose at the Commercial Section of the Ministry of National Economy in conformity with the Royal Order of 11 December 1929]

Exporters must present in the month of January of every year a certificate delivered by the Official Syndicate of Wine Exporters or by the Syndicate of Producer-Exporters of liquors and alcoholic beverages or, failing that, by the Chamber of Commerce of the particular district, as evidence that they are still exercising the same profession. Exporters who have been punished by serious penalties of a fiscal or commercial character may have their names struck off the register.

The registered number shall be reproduced on all cases in which wines, liquors and alcoholic beverages are exported.

Syndicates and associations of producer-exporters of wines, liquors and alcoholic beverages which existed legally before the publication of the present Decree who make application before 1 November 1930, may receive official recognition of their activity. For this purpose the syndicates or associations in question must represent more than half of the producer-exporters of the particular district.

After 1 November 1930 this official character shall only be recognized as belonging to the syndicates and associations representing two-thirds of the producer-exporters of the district and having a minimum membership of eight persons, official recognition cannot be given to more than one syndicate in the same region.

These official syndicates shall rank as official corporations, and shall be State consulting bodies. They shall represent the classes engaged in the production and exportation of wines, liquors and alcoholic beverages for all purposes, they shall have the right of inspection insofar as concerns the production, circulation and exportation of the said products; they shall have the power of controlling the use of marks and descriptions of origin and can take samples of any wines etc. sent abroad.

The advantages and facilities contemplated by the law shall be reserved exclusively to the members of the official syndicates. The areas within which the various official syndicates are to act shall be laid down by the General Department of Commerce and Customs Policy on the advice of the Official chambers of Commerce.

The official syndicates shall be under the general control of the General Department of Commerce which may delegate its rights to the Chambers of Commerce.

The official syndicates may unite to form regional Federations which shall enjoy the same rights and be submitted to the same control as the syndicates.

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AGRICULTURAL ECONOMICS AND SOCIOLOGY

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CREDIT

Agricultural Credit in the United States.

The agricultural credit system of the United States includes a considerable number of specialized institutions, some operating in the field of mortgage credit and some in the fields of production and marketing credits. In addition, there are the commercial and savings banks, most of which supply credits of all kinds. A distinguishing feature of the system is the extent to which the Federal government has gone in supplying special facilities for farmers.

Perhaps the best way to discuss agricultural credit in the United States is to describe the principal institutions which supply farm credits, and then indicate, as far as possible, how well the interests of the farmers have been served by these institutions. This plan will permit occasional reference to the vast personal and sectional differences which arise out of the far flung territory and the diversified resources, climate and racial elements of the country.

MORTGAGE CREDIT FACILITIES.

Table I shows the latest authoritative figures on the sources of mortgage credit in the United States. From this table it appears that about 63 per cent of the mortgage credit has been supplied by financial institutions, about 30 per cent by individuals, and about 7 per cent by a miscellaneous group of agencies, such as colleges and political subdivisions. These lenders had a total of nearly nine and one half billion of dollars in farm mortgage loans outstanding on January 1, 1928.

TABLE I. — *Farm Mortgages Held by Nine Principal Classes of Lending Agencies in the United States, January 1, 1928 (1).*

Lending Agencies	Percentage held by each agency — Per cent	Amount held by each agency — Millions of dollars
Federal land banks	12.1	1,146
Joint stock land banks	7.0	667
Commercial and savings banks	10.8	1,020
Mortgage companies	10.4	988
Insurance companies	22.9	2,164
Retired farmers	10.6	1,006
Active farmers	3.6	339
Other individuals	15.4	1,453
Other agencies	7.2	685
Total	100.0	9,468

(1) Compiled by David J. Wickens, Agricultural Economist, Bureau of Agricultural Economics, U. S. Department of Agriculture.

Fifteen years ago both the total of mortgage indebtedness and the relative positions of the lenders were quite different. At that time, there were no Federal land banks or joint stock land banks, and the total mortgage indebtedness was only about half its present amount. The story of these changes is interesting.

In 1915 commercial and savings banks occupied first place among the financial institutions which lent on farm mortgages. Including state, national, and private banks, more than 26,000 of these institutions were in operation. Each community had one or more banks, so that farmers had easy access to this source of credit. The limiting factor, however, was the supply of loan funds at the command of the banks which usually was dependent on the volume and character of local deposits. In some areas, notably the older eastern States, there was no serious lack of funds, but some of the western and southern States had inadequate supplies.

Only the most newly developed and uncertain areas, however, had to depend entirely on local sources of credit. The many life insurance companies, whose operations frequently were national in scope, welcomed good farm mortgage loans for investment. Likewise there was a large number of mortgage companies which made loans to farmers and sold the mortgages to their clienteles of insurance companies, banks, and private investors. In this manner, funds were transferred from areas of surplus capital to those where local capital was inadequate.

These transfers, though, were often costly and cumbersome, and investors were timid about placing their loans in certain areas. The western and southern States suffered most from these conditions, for there, in many cases, the legal status of mortgage holders was less secure than in other sections and the costs and risks of lending were greater than in areas of higher land values and more diversified production. Most mortgage loans at that time were dated to mature in five years or less time, and while renewals were granted generously, the process of renewal was costly and not always certain. The market for farm mortgages was narrowed by the fact that investors usually were offered specific mortgages, so that diversification of holdings was difficult for all except investors of considerable means.

Agitation for improvement in the farm mortgage credit system caused the subject to be given intensified study from 1911 to 1916. Public recognition of the need for improvement first appeared in 1908 in the report of the Country Life Commission. Some time later the foreign service of the Federal Government was asked to report on systems of agricultural credit used in other countries and in 1913 two commissions, the United States Commission, appointed by the Federal government, and the American Commission, appointed by the Southern Commercial Congress, went abroad to study European experience in agricultural credit. After several years of study and debate, the Federal Farm Loan Act was passed and became effective July 17, 1916.

In brief, this Act provided for the establishment of two kinds of banks, Federal land banks, and joint stock land banks both of which were to make farm mortgage loans and issue bonds in convenient denominations on the security of mortgages held in trust. Several other points of similarity may also be enumerated. Both were to be operated under Federal supervision; both were to make loans for long periods under the amortization principle of repayment; both were restricted to a lending rate not exceeding 6 per cent or 1 per cent above the rate carried by their most recent issue of bonds, whichever was the lower; and the bond issues and the income thereon of both were exempted from "Federal, State, Municipal and local taxation".

In several import respects, however, the two types of land banks were different. One of the features of the European systems which made a favourable impression

on those who had studied them was mutual liability on the part of farm borrowers. Accordingly, this idea was incorporated in the organization of the Federal land banks. The country was divided into twelve districts, each of which was to be served by one Federal land bank. Within each district, borrowers were to unite in local national farm loan associations, and by purchasing stock in the associations in an amount equal to 5 % of their loans and assuming double liability thereon, they were to become, to a limited extent, responsible for each others' indebtedness to the Federal land banks. Each Federal land bank, furthermore, was made liable for the obligations of all other Federal land banks.

Nothing suggestive of mutual liability was included in the provisions of the Act dealing with joint stock land banks. There was no stock purchase requirement of borrowers, and the joint stock land banks were not made responsible one for the other. On the contrary, the joint stock land banks were intended to be private enterprises, similar in many respects to the existing mortgage banks. To assist in marketing their securities they were given the privilege of issuing tax exempt bonds, but as a protection to the public they were required to operate under Federal law and supervision. There is reason for believing that the joint stock land banks were offered as a compromise to farmers who were disinclined to assume liability for the debts of others and to mortgage bankers who might find it difficult to compete with the Federal land banks.

Federal land banks were restricted as to the amount that could be lent to one borrower and to the purpose for which the loans could be made. The original maximum limitation on loans to one borrower was \$10,000, but this was raised in 1923 to \$25,000. It was stipulated that the loans could be made only for the purchase and improvement of land, the construction of buildings, the purchase of equipment, fertilizer and livestock necessary to the proper and reasonable operation of the farm mortgaged, and for the liquidation of previously existing indebtedness of the owner. Federal land banks were not permitted to lend to any party who was "not at the time, or shortly to become, engaged in the cultivation of the land mortgaged".

None of these restrictions was applied by the Act to joint stock land banks. The Federal Farm Loan Board, however, issued rulings to the effect that it would not approve as security for bond issues loans to a single borrower in excess of 15 % of the capital and surplus of the joint stock land bank which offered such a loan, and that it would not permit the issue of bonds in excess of \$50,000 on the security of a loan to a single borrower. Joint stock land banks were further required by the Board to confine their loans to those providing capital for agricultural development. Thus by ruling the joint stock land banks were restricted to a greater extent than was specifically stated in the Federal Farm Loan Act.

As an offset to the more rigid lending conditions imposed on Federal land banks, the Act permitted the Federal land banks to issue bonds until the amount outstanding was twenty times the capital and surplus, whereas the maximum expansion ratio allowed the joint stock land banks was fifteen to one. Moreover, the Federal government subscribed the original capital stock of the Federal land banks, while the joint stock land banks were left to raise capital in the same manner as any other banking institution.

The establishment of the Federal Farm Loan System did not drive the other lending agencies out of business. As time has passed, the Federal farm loan banks have handled an increasingly greater proportion of the farm mortgage debt (Table II), but the absolute increase in farm mortgage indebtedness since 1915 has added to the business of all classes of lenders. Farmers at present have access to about the

same number of commercial and savings bank offices as in 1915. There now are twelve Federal land banks, and about fifty joint stock land banks. Some fifty insurance companies handle more than 90 per cent of the farm mortgage business of all insurance companies, and there is an unknown but considerable number of mortgage companies.

TABLE II. — *Percentages of Farm Mortgage Debt in the United States held by Principal Lending Agencies, January 1, 1920, 1925 and 1928. (1)*

Lending Agency	Ratio of Holdings of Each Agency to Total Mortgage Debt		
	1920	1925	1928
Life insurance companies	12.4	20.7	22.9
Federal land banks	3.6	9.9	12.1
Joint stock land banks	0.7	4.8	7.0
Commercial and savings banks (2) . . .	18.4	No data	10.8
Mortgage companies	No data	No data	10.4

Nearly all of these institutions, in making an original advance upon the security of farm mortgages, limit their loans to a maximum of 50 per cent of the value of land and buildings. They also confine themselves mainly to first mortgages. Changes in land values and in the condition of borrowers, however, frequently cause loans after they have been made to rise above fifty per cent of the value of land and buildings. Commercial banks in many cases, acquire junior mortgages to support previously existing lines of credit which were unsecured.

The ordinary term of loans made by the Federal farm loan banks is 33 years, the contract calling for semi-annual payments on principal. Insurance companies and mortgage companies still have most of their holdings in 3 to 5 year loans, but have made in recent years a rapidly increasing volume of longer term loans on the amortization plan. The mortgage loans of commercial and savings banks generally range from 1 to 5 years in term. In the case of the shorter term loans, of course, there are many renewals.

A few words should be said about individuals who hold farm mortgages. It is best to divide such individuals into two groups, *i. e.*, former owners of the land mortgaged and other investors. The latter group purchases mortgages as an investment and generally insists on about the same terms as are required by financial institutions. Former owners, however, usually make no advance of funds to the borrower, but simply hold back a mortgage as part payment on the purchase price of land. The volume of mortgages held by former owners conforms closely to the volume of land transfers, and since owners frequently are anxious to sell, they are willing to accept greater risks and grant more liberal terms than financial institutions and private investors.

The relative importance of the different sources of mortgage credit to the various geographic divisions of the country is reflected in Table III. New England and the Pacific States rely chiefly on commercial and savings banks and individual

(1) Compiled by David L. Wickens, Bureau of Agricultural Economics, U. S. Department of Agriculture.

(2) December 31.

investors. Individuals and Federal land banks are the leading mortgage lenders in the Middle Atlantic, South Atlantic and Mountain States. In the North Central States insurance companies and individual lenders are most important while Federal land banks and insurance companies are the principal lenders in the South Central States.

TABLE III. — *Percentages of Mortgage Indebtedness of Geographic Divisions held by Principal Lending Agencies, January 1, 1928 (1).*

Geographic Divisions	Holdings of Principal Lending Agencies						
	Federal land banks	Joint stock land banks	Commercial and savings banks	Mortgage companies	Insurance companies	Individual investors	Other agencies
	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent
New England	16.6	—	37.7	—	.04	36.6	9.1
Middle Atlantic	11.7	6.0	10.5	.5	.10	63.9	7.3
East North Central	8.2	7.7	14.0	5.8	19.4	36.5	8.4
West North Central	7.0	5.4	6.2	15.1	32.3	28.2	5.8
South Atlantic	21.7	16.4	10.7	1.5	12.5	30.2	7.0
East South Central	34.5	7.3	11.1	2.8	28.0	13.9	2.4
West South Central	23.7	11.3	4.1	14.9	25.0	13.0	8.0
Mountain	21.8	4.7	16.7	14.9	5.6	29.3	7.0
Pacific	11.4	6.2	28.1	5.3	7.7	27.4	13.9

§ 2. — PROBLEMS AND EXPERIENCES IN MORTGAGE CREDIT.

Before the Federal Farm Loan System was established, the principal mortgage credit problem was to secure an adequate volume of funds at moderate cost for those sections of the country that were most in need of capital. Within a few years after the Federal farm loan banks began operations, substantial progress had been made in the solution of this problem. Interest rates, as indicated in Table IV, had been reduced materially by 1920, particularly in the southern and western States. Also, between 1910 and 1920, there was an enormous increase in the volume of mortgage credit, particularly in the years following 1915, these same areas leading in the rate of expansion. This development is shown in Table V.

It is difficult to estimate the influence of the Federal Farm Loan System in effecting these changes. The Federal land banks, from organization to November 30, 1919, advanced only slightly more than 6 per cent of the total increase in mortgage credit between 1910 and 1920, as shown in Table VI, and the joint stock land banks supplied a trifle more than 1 per cent of the increase. In some areas, notably the Middle Atlantic, South Atlantic and South Central States, considerably greater proportions of the increase were obtained from the Federal land banks.

The war and immediate post-war periods, however, were conducive to credit expansion. Under the urge of war time needs for foodstuffs, and the easy credit policy effectuated through the Federal Reserve System, the cultivated area of the United States was expanded materially, the prices of farm products rose far above the levels of former years and land values were increased to unprecedented heights. These conditions, for the time being, greatly increased the value of the security of-

(1) Preliminary results of study based on questionnaire to 13,000 farmers conducted by David L. Wickens, Bureau of Agricultural Economics, U. S. D. A.

TABLE IV. — *Average Interest Rates on Farm Mortgage Loans, 1915 and 1920.*

(Rates for states in each geographic division having highest and lowest average rates).

Geographic division		Average rates currently charged 1915 (1)	Average rates on mortgage debt 1920 (2)
		Per cent	Per cent
New England.	Highest	6.1	6.1
	Lowest	5.3	5.1
Middle Atlantic.	Highest	5.5	5.4
	Lowest	5.5	5.3
East North Central.	Highest	6.3	6.0
	Lowest	5.7	5.3
West North Central.	Highest	7.0	6.7
	Lowest	5.6	5.5
South Atlantic	Highest	9.0	7.3
	Lowest	5.6	5.6
East South Central.	Highest	8.7	7.5
	Lowest	6.7	6.0
West South Central.	Highest	9.0	7.8
	Lowest	6.6	6.6
Mountain.	Highest	9.7	7.7
	Lowest	8.2	6.8
Pacific.	Highest	7.9	6.7
	Lowest	7.4	6.5

TABLE V. — *Total Farm Mortgage Debt in the United States, January 1, 1910, 1920, 1925, 1928, and Per Cent of Change from Previous Dates, by Geographic Divisions.*

Geographic Divisions	Total Debt (3)				Change in Debt					
	1910	1920	1925	1928	1910-1920		1920-1925		1925-1928	
	1000 dollars	1000 dollars	1000 dollars	1000 dollars	Per Inc.	cent Dec.	Per Inc.	cent Dec.	Per Inc.	cent Dec.
United States.	3,320,470	7,857,700	9,360,620	9,468,526	136.6		10.1		1.2	
New England	76,110	120,860	123,748	122,494	58.8		2.4		1.0	
Middle Atlantic	281,530	396,640	388,768	376,614	40.9			2.0	1.3	
East North Central	794,950	1,591,420	1,001,887	1,050,126	100.2		17.0		4.7	
West North Central	1,296,080	3,190,600	4,126,402	4,056,187	146.9		20.0		1.7	
South Atlantic	141,250	347,470	439,609	401,806	146.0		28.5		11.9	
East South Central	123,560	320,100	356,378	381,497	159.1		11.3		7.0	
West South Central	291,210	703,680	360,260	601,252	141.6		22.3		4.8	
Mountain	113,710	544,550	533,787	496,551	378.9			2.0		7.0
Pacific	202,070	633,290	660,742	601,009	213.4		5.8		3.3	

(1) U. S. D. A. Bulletin 384.

(2) 1920 Census.

(3) Estimated by the Division of Agricultural Finance, Bureau of Agricultural Economics, U. S. D. A.

TABLE VI. — *Increase in Farm Mortgage Debt in the United States, 1910 to 1920, and Proportion of Increase Attributable to Federal Land Banks.*

Geographic Division	Increase in mortgage debt 1910 to 1920 (1)	Loans closed by Federal land banks from organization to November 30, 1919 (2)	Percentage of increase in mortgage debt due to Federal land bank loans
	(ooo)	(ooo)	Per cent
United States.	4,537,230	282,008	6.22
New England.	44,750	5,586	12.48
Middle Atlantic.	115,110	7,942	6.90
East North Central.	796,470	27,490	3.45
West North Central.	1,903,610	82,027	4.31
South Atlantic.	206,220	23,816	11.55
East South Central.	196,540	24,509	12.47
West South Central.	412,470	40,193	11.93
Mountain.	430,840	31,994	7.43
Pacific.	431,220	29,452	6.83

• (1) Computed from estimates by the Division of Agricultural Finance, Bureau of Agricultural Economics, U. S. D. A.

(2) Compiled from Third Annual Report of the Federal Farm Loan Board.

ferred for farm mortgage credit and the ability of farmers to pay interest on indebtedness. Abundant supplies of credit were available, furthermore, as a result of the inflationary credit policies adopted by the country.

While the Federal Farm Loan System served admirably as a means of supplying farmers with mortgage credit, by far the greatest part of the increase, as has been pointed out, came from other agencies. Inflationary policy, a feature of which was the maintenance of low interest rates, undoubtedly was responsible to a considerable extent for the reduction of interest charges on farm mortgage indebtedness. It is equally certain, however, that the existence of a great and growing system of facilities, which stood ready to supply mortgage credit at low rates of interest and at minimum handling charges, such as the Federal Farm Loan System, had an important influence in reducing the rates charged by other agencies.

The war period, with its increasing farm prosperity, was followed immediately by an era of extravagant indulgence. In many sections of the country an intense speculation in farm lands developed, which itself gave rise to an enormous increase in farm mortgage indebtedness. Local governments entered into ambitious plans for local improvements. Instead of reducing the indebtedness and creating reserves when they had the opportunity, farmers burdened themselves with heavy indebtedness and high taxes.

With the much lower farm prices that have prevailed since the recession in 1920 and 1921, farmers have been hard pressed to meet the fixed charges, represented chiefly by interest and taxes, that were incurred during, and before 1920. Some regions, moreover, have suffered serious crop damage from such pests as the boll weevil in the cotton States and the corn borer in the East North Central States. As a result, land values have fallen to low levels, and foreclosures and reversions have been numerous.

These developments have not affected all parts of the country with equal force. As shown in Table VII, the New England, Middle Atlantic and Pacific States in the main have had less difficulty than other sections. Conditions have been worst in the Central, South Atlantic, and Mountain States. Nor have the casualties been confined to farmers. Three joint stock land banks, a number of mortgage companies, and several thousand country banks have failed as a result of the agricultural depres-

sion. Countless going concerns have suffered heavy losses. Although losses in many cases have been minimized by foreclosure, in other cases the farms thus acquired have been a source of continuing loss. Financial institutions, as a general rule, have lacked experience in managing farm lands and have not been able to give the close supervision which is needed for the successful operation of both rented and managed farms. They usually have been anxious to dispose of their holdings, consequently, and have offered very liberal terms to prospective purchasers.

A great deal of farm land has come into the possession of unaccustomed and unwilling owners since 1920. The result has been to accentuate the weakness in the market for farm lands, so that not only have prices fallen continuously since 1920 but it has been difficult to find buyers even at sacrificial prices. Persons who have the means and normally would purchase land have hesitated to buy on a falling market, particularly while so much land remains to be worked out of the hands of financial institutions. As land values have fallen, moreover, loan companies have reduced as rapidly as possible the per acre amounts of advances that were outstanding, and the payments required of borrowers in many cases have left scanty margins of income for other expenditures. This policy not only has reduced the land purchasing power of a considerable part of the farm population, but it also has made farmers hesitate to assume the burdens of mortgage indebtedness.

TABLE VII. — *Decline in Land Values, Foreclosures, and Distribution of Debt Ratios in the United States and by Geographic Divisions.*

Geographic Division	Percentage (1) decline in farm land values, March 1, 1920 to March 1, 1929	Foreclosure (2) in percentage of all farms mortgaged, March 1, 1928 to March 1, 1929	Distribution of debt ratios above (3) 50 % of land values as percentage of all farms mortgaged, January 1, 1928		
			Over 100 %	Over 75 %	Over 50 %
United States	31.8	4.0	4.4	12.2	35.7
New England	10.0	2.3	1.3	5.1	21.4
Middle Atlantic	19.8	2.7	2.6	9.8	30.9
East North Central	37.9	4.3	6.2	17.8	45.1
West North Central	39.1	5.5	7.3	17.4	44.8
South Atlantic	32.8	6.3	5.0	13.4	37.1
East South Central	35.2	5.5	4.3	8.9	35.4
West South Central	23.2	3.7	3.3	8.1	26.1
Mountain	33.1	6.1	4.0	9.8	28.6
Pacific	8.9	3.5	3.3	7.8	24.6

(1) Computed from "The Farm Real Estate Situation 1928-1929" Circular 101, U. S. D. A.

(2) Prepared by David L. Wickens, Bureau of Agricultural Economics, U. S. D. A.

For several years after 1920, as floating indebtedness was funded and farmer had to incur further indebtedness to cover operating losses, the mortgage debt continued to grow rapidly. Since 1925, the increase for the country as a whole has been very small, although in some sections, notably the South Atlantic States, a considerable increase has occurred. Many farms previously unencumbered have been mortgaged since 1920. Interest rates remain moderate, as indicated in Table VIII.

Summarizing these developments it is clear that conditions now differ in many important respects from those which existed at the time the Federal Farm Loan System was established. Instead of rising, land values now are falling, so that mortgage lenders must exercise great caution lest the security for their advances become insufficient. Instead of having an active market for such lands as they acquire by

TABLE VIII. — *Percentage Distribution of Mortgage Debt on Reporting Farms, by Rate of Interest for the United States and Geographic Divisions on January 1, 1928.*

Area	Distribution of debt according to interest rate				
	4 per cent and less	4.1 per cent to 6 per cent	6.1 per cent to 8 per cent	8.1 per cent to 10 per cent	10.1 per cent and over
	Per cent	Per cent	Per cent	Per cent	Per cent
United States . . . . .	.40	76.25	22.09	1.25	.01
New England . . . . .	.96	92.24	6.50	—	.30
Middle Atlantic	1.78	97.26	.80	.07	—
East North Central . . . . .	.68	90.08	9.20	.03	.01
West North Central . . . . .	.27	90.88	8.47	.38	—
South Atlantic . . . . .	.44	62.49	31.87	5.20	—
East South Central	—	88.61	10.72	.64	—
West South Central . . . . .	.08	48.06	49.80	2.05	.01
Mountain	—	53.22	39.70	7.08	—
Pacific . . . . .	.28	49.58	40.93	.21	—

foreclosure, mortgage agencies now find it exceedingly difficult to dispose of such holdings. Whereas before 1920, farmers in most parts of the country could expect appreciation in the value of their land holdings, now they are looking almost entirely to the current income producing power of land. Those who incur indebtedness have to consider seriously the possibility that this indebtedness will become more burdensome as time passes.

A condition of special importance has arisen in connection with the Federal Farm Loan System. The failure of three joint stock land banks and accumulation of foreclosed land in several of the Federal land banks as well as a number of joint stock land banks have caused a considerable depression, since 1926, in the value of the securities issued by these institutions. So low have these securities fallen that many of the banks have found it more profitable to buy up their own securities at a discount than to make farm loans. Since operating profits are urgently needed at the present time to cover the losses sustained on real estate, the current tendency is to employ in this fashion the funds received from amortization payments on borrowers' loans. Conditions are not favourable, moreover, for the issue of new securities. As a consequence, many of the joint stock land banks are virtually in a state of voluntary liquidation, and the Federal land banks, although not affected in like degree by these conditions are also curtailing their lending operations (1). (See Table IX).

Perhaps the chief problem of mortgage credit at the present time is determination of the future course of farm income and land values. If that problem could be solved, there would be a far more certain basis for dealing with the land holdings of mortgage agencies and the excessive indebtedness of many farmers. With the present downward trend of land values, and uncertainty regarding the future trend, it seems necessary to reduce the indebtedness on a considerable number of farms to amounts which are more commensurate with their productivity.

It should not be concluded, however, that any significant restriction in the total volume of mortgage loans is justified. According to a survey made in 1928, only 36 per cent of the farms of the country were mortgaged, and of the mortgaged farms slightly more than one-third carried indebtedness of more than half their value. With the material changes that are taking place in American agriculture

(1) Compiled from data supplied by David L. Wickens, Bureau of Agricultural Economics, U. S. D. A.

TABLE IX. — *Loans Closed Annually and Loans Outstanding on December 31, of the Federal Farm Loan Banks (1) 1926-1929.*

Year	Joint Stock Land Banks		Federal Land Banks	
	Loans closed Jan. 1 to Dec. 31	Loans outstanding Dec. 31	Loans closed Jan. 1 to Dec. 31	Loans outstanding Dec. 31
	1000 dollars	1000 dollars	1000 dollars	1000 dollars
1924	(2)	446,420	165,510	927,568
1925	(2)	545,559	127,355	1,005,684
1926	(2)	632,476	131,313	1,077,819
1927	83,719	661,057	140,384	1,155,644
1928	40,572	656,516	102,236	1,194,470
1929	18,188	626,980	64,251	1,197,950

it is entirely likely that a considerable amount of mortgage credit will be needed to facilitate changes in production systems. The large proportion of farms which at present are un-encumbered or which can sustain greater indebtedness will afford ample security for a vast amount of additional credit, if it should be needed.

§ 3. — PRODUCTION AND MARKETING CREDIT FACILITIES.

The principal source of production and marketing credits, considering farmers of the country as a whole, is the commercial banking system. At present there are some 25,000 banks in the system, including banks operating under both National and State charters. Not all of these banks directly finance farmers. Most of them, however, are located in the smaller cities and towns where they are easily accessible to farmers, and relatively few farm communities are without some form of banking service. The latter class frequently is designated "country banks".

Although concentration of banking resources has proceeded rapidly in recent years, by far the greater number of banking offices in the United States are independent units. This is particularly true of country banks, for concentration of control has been applied chiefly to city institutions. The independent unit bank in a small town or city depends mainly on the volume of local deposits for its lending power, and supplements this source of funds by borrowing, when necessary, from city correspondents of the Federal reserve banks.

Country banks differ widely in their ability to finance local requirements. In sections of highly diversified production, such as the mid-western States, the deposits (main loan fund) of country banks fluctuate very little with changes in the season and loan requirements are well distributed throughout the year. Banks operating under conditions such as these usually can satisfy all local demands for production and marketing credits on the part of solvent and trustworthy customers. In the southern and some of the western States, however, undiversified production causes the deposits to fluctuate over a very wide range, the low point occurring just before products are sent to market and the high point being attained at the end of the marketing season. Loan demands accumulate through the production season, also, so that by marketing time the lending power of the banks is often totally exhausted. Banks operating in an environment of this kind may satisfy a considerable

(1) Compiled from Annual Reports of the Federal Farm Loan Board.

(2) Not available in easily accessible form.

portion of production credit requirements, but seldom can supply much marketing credit.

To obtain marketing credits for areas of this type several methods of procedure are followed. First, dealers, millers, packers, speculators, or others who buy the product in question arrange for credits at metropolitan banks and pay cash to the farmers at marketing time. This was the earliest method developed and it is still used extensively in both livestock and produce markets. Second, where co-operative marketing associations have been established, these associations often borrow from metropolitan banks and upon delivery make an initial advance to the growers of 60 to 70 per cent of the current market value of the crop. Additional advances are made as the crop is marketed. Third, co-operative marketing associations borrow from the Federal intermediate credit banks, and then follow the same procedure with the growers as when funds are obtained from metropolitan banks.

There are twelve Federal intermediate credit banks, one in each Federal land bank district. Congress made provisions for these institutions in the Agricultural Credits Act of 1923, and supplied their entire paid in capital fund of \$30,000,000 (\$2,500,000 each) from the Federal treasury. The Federal intermediate credit banks raise funds in the central money markets by the issue of collateral trust debentures, and extend credit in two ways: (1) by making direct loans to co-operative marketing associations, and (2) by discounting eligible paper which is presented by banks, trust companies, livestock loan companies and agricultural credit corporations. The term of advances by the Federal intermediate credit banks is limited by law to from nine months to three years. In practice the advances generally have not exceeded one year, although under suitable conditions, renewals have been granted. The law also contains a careful statement of the purposes for which advances may be used, the intent being to confine the banks to strictly agricultural loans.

From organization in 1923 to date, the direct advances to co-operative marketing associations have been slightly greater in amount than the discounts for banking institutions, livestock loan companies and agricultural credit corporations. Very few banks discount paper with the Federal intermediate credit banks, as they have adequate rediscounting facilities in the Federal reserve banks and city correspondents. Furthermore, there is a limitation on rates charged farmers when paper is discounted at the Federal intermediate credit banks, which often is not in line with local banks loan rates, and for that reason, is objectionable to the banks. Most of the discounts of the Federal intermediate credit banks, therefore, are acquired from livestock loan companies and agricultural credit corporations. The growing number, and use made, of these institutions, have caused the volume of discounts in the past two or three years to exceed the volume of direct advances to co-operative marketing associations. The total of these operations from organization to December 31, 1929, is shown in Table X.

TABLE X. — *Loans and Discounts, Original and Renewal, by Federal Intermediate Credit Banks from Date of Organization to December 31, 1929. (1)*

Loans (Direct Advances)		Discounts	
Original	Renewals	Original	Renewals
\$208,924,867.18	\$171,400,702.06	\$290,647,714.43	\$145,303,495.04

(1) Thirteenth Annual Report of the Federal Farm Loan Board.

In the main, direct advances to co-operative associations represent marketing credits, while the discounts for financial institutions are used to finance production. The Federal intermediate credit banks thus supply both production and marketing credits. Marketing credits in the form of direct advances have been of considerable amount only in the cotton, tobacco, wheat, and fruit producing areas. The discounts have been greatest in the grazing areas, although a considerable volume of discounts has been used to finance cotton, tobacco, wheat and fruit production.

The financial institutions which have been described supply by direct loans or discounts most of the production and marketing credits used by farmers. As noted, however, it frequently is necessary for marketing associations, dealers or processors of agricultural commodities to take products off the farmers' hands at marketing time and themselves arrange for the credits to finance the productions until they enter into consumers' markets. This process usually transfers the burden of financing from country banks to metropolitan banks or the Federal intermediate credit banks.

A somewhat similar plan is followed in some areas with production credits. Particularly in the southern States, a considerable proportion of farmers are not regarded as good bankable risks and must look elsewhere than to financial institutions for their credit accommodation. In such areas, a system of merchant credits has been developed. Under this system merchants sell fertilizer and supplies to farmers on various deferred payment plans and finance themselves by borrowing at local banks or buying on a deferred payment basis from their supply houses. A great deal of production credit is supplied to farmers in this round-about fashion.

Merchant credit, as found in the southern States, is extremely costly and tends to perpetuate the conditions which are responsible for its use. Studies made by the Bureau of Agricultural Economics, U. S. D. A., and various of the State agricultural experiment stations indicate that the average rate of charge, figured on a per annum basis, is at least 30 per cent. Credit costs such as these are a heavy burden to the farmer and make it difficult for him to improve his financial position.

Farm machinery companies finance a large volume of farm paper, which from some points of view may be regarded as production paper. This source of credit is especially important in the wheat raising areas, where large scale operating with an extensive use of machinery is prevalent. Credit extended in this way is not strictly comparable with credit in the South, as the rates of charge are moderate and the class of borrowing risks involved is of superior standing.

A new source of credit was provided for farm organizations by the Agricultural Marketing Act, which became effective June 15, 1929. Under this Act, the Federal Farm Board was created and given very broad powers to be used in the markets for farm commodities. Among its powers, the Board was authorized to make loans to co-operative associations for the purpose of assisting in :

" (1) the effective merchandising of agricultural commodities and food products thereof ;

(2) the construction or acquisition by purchase or lease of physical marketing facilities for preparing, handling, storing, processing, or merchandising agricultural commodities or their food products ;

(3) the formation of clearing house associations ;

(4) extending membership of the co-operative association applying for the loan by educating the producers of the commodity handled by the association in the advantages of co-operative marketing of that commodity ; and

(5) enabling the co-operative association applying for the loan to advance

to its members a greater share of the market price of the commodity delivered to the association than is practicable under other credit facilities".

The Board was also authorized to make loans to stabilization corporations, which were to be established for the purposes of acting as marketing agencies for agricultural commodities and of controlling any surpluses of the commodities which might develop. Loans to stabilization corporations were to be used as working capital.

Although the sum of \$500,000,000 was appropriated for the purposes of the Act, to date only half of this sum has been made available to the Board. Loans to co-operative associations and stabilization corporations now stand at approximately \$180,000,000. These advances have been made on very liberal terms. Interest rates by the enabling Act have been limited to the lowest rate yielded by any Government obligation issued subsequent to April 6, 1917 (except postal savings bonds) and outstanding at the time the advance was made. Security margins, in many cases, have been far more slender than would be acceptable to any commercial lending organization.

This is not the first instance of the Federal government's attempting to aid agriculture by making loans upon a more liberal basis than is common among commercial lending agencies. At various times, both the Federal and State governments have appropriated large sums to be used in making advances for the purchase of seed, feed and fertilizer. Loans of the latter classes, however, usually have been made to individual farmers who did not have access to other credit agencies.

§ 4. — PROBLEMS IN PRODUCTION AND MARKETING CREDIT.

Perhaps the most spectacular recent development affecting production and marketing credits in many parts of the country has been the failure, since 1920, of several thousands of country banks. Numerous small communities have been left without adequate and convenient banking service as a result of these failures, and heavy losses have been sustained by stockholders, depositors and borrowers. Failures have occurred chiefly among banks doing an agricultural business. The principal cause of failure appears to be losses which have grown out of the sustained agricultural depression.

Efforts are now being made in many quarters to expand the scope of branch banking. Branch banking within metropolitan limits is permitted at present in a considerable number of States, and a few other States permit branch organizations to expand within county or State boundaries. There is strong opposition in most parts of the country, however, to the establishment of large branch systems, and either by statute or legal interpretation a good many States prohibit branch banking in any form. As a result of these inhibitions California is the only State in which branch banking is practiced on a large scale.

Those who now are urging the expansion of branch banking as a remedy for bank failures point to the superior structural strength and the greater fluidity of funds in branch systems. Their opponents retain a preference for the democratic foundations of the unit bank system, and believe that by increasing the rigor of laws and supervisory methods the unit bank system can be made satisfactorily strong. A singular feature of the contest is that the agricultural States, which have suffered most severely from bank failures, generally lead in the opposition to branch banking. How this question will be disposed of cannot now be definitely foreseen, but it is one of the most important financial issues at present calling for solution.

Of rather similar character is a question raised by the recent development of

"group" banking systems. During the past two or three years concentration of control in the form of group banking systems has proceeded to the point where a few of these systems now control several billions of dollars of bank resources. The nucleus of such a system is the holding company, which acquires a controlling interest in numerous unit banks. Each unit bank thus acquired is legally independent, having no responsibility to other units of the system. Each unit is subject to either State or National regulation, and a system as a whole includes many banks of both types. The head offices or holding companies are claimed to have non-banking functions and are not subject to the supervision of banking authorities. In addition, most group systems include investment houses and security affiliates which also are exempt from the regulation of Government banking authorities.

Since, under existing laws, group banking systems have been able to expand at a rapid pace, and since they embody virtually as much centralization of control without the undivided responsibility of branch banking systems, many persons are wondering if the restrictions on branch banking are not promoting the growth of a less reliable type of banking. A considerable body of opinion favours the abolition of all concentration in banking; but the means of dissolving existing systems is not yet clearly defined. The determination of policy with respect to group banking systems, however, is a problem of equal rank with that presented by branch banking.

A third problem is concerned with the agricultural credit corporations which, by rediscounting with the Federal intermediate credit banks, obtain production credits for farmers. As previously noted, these corporations have been most active in the cotton producing and grazing areas. Operating on a spread of two to two and one-half per cent above the rediscount rates of the Federal intermediate credit banks, some of the agricultural credit corporations have not been able to pay expenses and cover losses.

This is not an uncommon situation among business and financial institutions and it would have little significance except for two facts. The first of these is that agricultural credit corporations in the cotton belt have been peculiarly susceptible to this weakness, owing chiefly to the hazards and the extreme seasonality in cotton financing. The second point is that the cotton States are more in need of outside funds than most other sections of the country and, so far as production credits are concerned, the Federal intermediate credit banks are powerless to help this section except through the medium of agricultural credit corporations.

It is extremely important, therefore, that some means be devised whereby agricultural credit corporations in the cotton belt can be made self-sustaining. To date the larger and more important agricultural credit corporations operating in the South have been linked up closely with co-operative marketing associations, and in most cases, have been supported financially by these associations. Whether or not their expense has been justified by the services rendered to association members is an unsettled question. Certainly a much more reliable source of production credits would be secured for cotton growers if the corporations were able to sustain themselves.

The last and probably the most important problem to be discussed here has to do with the adjustments which world changes since the War have required of American agriculture. Opinion is not unanimous as to either the underlying conditions that have required these adjustments or to the character of the adjustments that should be undertaken. Several of the adjustments that have taken place, however, are obvious, whether or not they have been wisely adopted.

In the West North Central States of Minnesota and the Dakotas, for instance, rapid progress has been made in the diversification of agriculture, embracing increased

production of corn, feed crops, truck crops, and livestock, particularly dairy animals. Less emphasis is now placed on cash grain crops than was formerly the case. Western Kansas and Montana, on the other hand, have placed more emphasis on cash crops by extensive cultivation and the use of combine-harvesters. The center of cotton production has shifted rapidly westward, and the eastern sections of the cotton belt have been more dependent on truck crops. In the poorer sections of the South, East and Northwest, a considerable amount of land has been abandoned. The agricultural population has been diminished since 1920 by several millions of persons. Likewise, the decline in land values has been one form of adjustment to new conditions.

These are but a few of the changes that have been made in agriculture. Each shift in production, population or land values has called for a change in financial policy. In some cases, notably the diversification program in the northwestern States, progressive financial leadership has been responsible in large measure for the change. Whether or not they are able actively to promote such adjustments as are needed in their sections of the country, financial leaders have the responsibility of aiding and encouraging these changes. Resistance to economically justified change only retards local development, or intensifies local distress, as the case may be. There is need for careful study of this problem in all parts of the country and the adoption of such policies as are best adapted to local requirements.

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FARM ECONOMICS

Limitations of Extension of Arable Cultivation in Victoria (Australia).

The statement is made from time to time that there are still large areas in Australia capable of intensive arable cultivation on which little or no attempt has so far been made towards development. A study which has recently been published by the University of Melbourne is directed to disproof of this view, so far at least as the wheat growing State of Victoria is concerned. The writer, who is Professor of Agriculture in the University, treats the subject under two distinct heads, an assessment of the economic position of a recently settled area, and a survey of other areas in the State in which cultivation is only partially developed. His object is to discover the forces which restrict the area under arable cultivation. As he states at the outset, ultimately, cultivable area is a matter of economics, in particular of the cost of labour and of the local price commanded by the products.

The recently settled area chosen for discussion is the Northern Mallee a district in the extreme north west of the State, a rolling plain originally covered by a fairly dense vegetation chiefly composed of Eucalyptus species (known as *mallee*). The soil is a sandy loam, varying from a fertile type which is only found in patches to sandy semi-desert or salt pans, with intermediate types on which in a wet season crops do well. The type of farming introduced is that of combined wheat and sheep farming, a type now very generally recommended in Australia. The total area under wheat in 1929 in the whole area was nearly 18 million acres (17,922,000) and the total number of sheep was 9,370,000. The whole district is devoid of any satisfactory natural water-supply. A water service for stock and domestic use has been arranged

by the State Rivers and Water Supply Commission but not without difficulty owing to the porous nature of much of the soil. The cost of this supply varies from 4*d.* to 1*s.* per acre per annum. The rain fall is not altogether favourable to wheat production, whether in regard to the quantity of precipitation or to its distribution over the months, and for this reason it is the opinion of experts that even with good farming methods an average of about 10 to 12 bushels per acre is all that can be expected in the area. An unfavourable climatic feature is the prevalence in late spring and summer of strong hot northerly winds blowing from the central zones of the Continent.

The general system of agriculture in the Northern Mallee includes the production of wheat, fat lambs and wool, while oats are grown primarily for hay for the work animals and in exceptionally good seasons a crop of oats may be reaped. Oats are not however a satisfactory money crop as any considerable extension of oat grain production would cause a rapid decline in the market price. The sheep do well on grazing and require in that climate little or no additional feeding. For satisfactory wheat yields previous fallowing is essential, the suitable rotation for the district being one year of fallow kept free of weeds and grazed by sheep, in the second year a wheat crop, the stubble being grazed after harvest, and in the third year a crop of oats which may be put in with very little previous cultivation on part or all of the wheat stubble. The oats may be directly grazed by the sheep or grown for hay, sometimes for grain, and in any case are once more succeeded by the bare fallow, thus completing the rotation : fallow, wheat, oats.

It is estimated that the optimum size of the holding under this system is 1350 acres, 1200 under cultivation in the above rotation, 60 acres for farm buildings, roads, channels, etc., and about 90 acres on an average allowed for the occurrence of soils of the useless or unremunerative type. The 1200 acres optimum is arrived at from the labour considerations which make 400 acres of wheat a reasonable maximum for a year of average crop.

In regard to the sheep-carrying capacity of the average holding, the experience of farmers on land yielding 18 bushels per acre suggests that stubbles on such an area will carry one sheep to the acre for about four months, fallows will carry one sheep to eight acres through the year, "grass" or uncultivated land with weeds will support one sheep to an acre and a half, while oats sown for grazing will support three sheep to the acre for six months. Or on the basis of sheep per acre per annum the carrying capacities of stubble, fallow, "grass" and oats may be stated as 3, 8, 1.5 and 0.66 acres respectively. Using these figures as a basis for calculating the carrying capacity on less productive Northern Mallee lands, farmed on the system described above, the 525 acres of wheat and oat stubble together represent a grazing capacity of 107 sheep, the 275 acres under oats represent 253, the 400 acres of fallow 30, and the 90 uncultivable acres will support 36 sheep. The total maximum flock is thus 426, but in view of the wide fluctuations of the rainfall it would be unwise to stock to full capacity, and some margin must be allowed. In a good season some reserves of oaten hay may be secured to meet the more difficult years. The margin advised is 25 per cent., giving a flock which is best composed of from 320 to 310 ewes and 10 rams.

The average production of marketable lambs may be reckoned at about 66 per cent. of the ewes, *i. e.*, about 206 lambs, valued at 1*s.* each, giving £165. Allowing for loss of ewes at about 5 per cent. and reckoning for 8 lbs. of wool per head the quantity of wool may be estimated at 2432 lbs. which if sold at 10*d.* per lb. gives £201. The total return from lambs and wool is therefore £266. Allowing for losses and depreciation on animals, and for the interest in capital locked up in the sheep, or 6 per

The receipts from the farm will vary according to the market price of wheat in the first place. On an average the 400 acres will return 4400 bushels and the returns will be £706, £816 or £926 according as the price at the local railway station is 3s. 6d., 4s. or 4s. 6d. per bushel, with 3½d. per bushel for the cost of the bag in each case. The return might be even less with the present decline in wheat prices. As regards oats the whole produce is generally used on the farm and does not enter into the account. The sheep yield is, as calculated, £218. Hence the total return available for meeting expenditure varies between £924 and £1144, according to the price of wheat.

The costs of the farm vary in the first instance according to the price of seed wheat. Taking seed wheat at 3s. 9d. per bushel, the costs may be estimated at £578, the items being as shown in the following statement :

Hired Labour	£156
Seed wheat at 3s. 9d.	» 62
Seed oats	» 60
Rates and insurance	» 60
Sundries	» 40
Superphosphate	» 75
Depreciation on machinery, etc.	» 95
Upkeep of fences, buildings, etc	» 30

	£578
If seed wheat is charged at 4s. 3d.	£587
» » » » » 4s. 9d.	£595

Of the above costs *labour* is the most important item. For the operations as contemplated the farmer must either employ another man whole time, or must obtain extra help at higher rates for shearing, hay cutting, bag sowing and carting. The former is for various reasons probably the more economical plan, and with present wage rates £3 a week must be allowed. The quantity of seed wheat required for 400 acres is most profitably 50 lbs. For oats one bushel (of 39 lbs.), is required per acre hence the cost at 3 s. for 400 acres will be £60. Rates include water rates, which may be as high as £50 though usually about £23, and other charges such as insurance of crops and fences. Sundry items include binding twine, oil and lubricants, machine spare parts, and copper compounds. As regards superphosphates an application of 60 lbs. to the acre of wheat is an economic recommendation, and a small dressing enhances the value of the oat crop. The total fertiliser requirement is hence about 14.2 tons which at £5 5s. per ton is £75. The depreciation on machinery is in this district, where the ground is full of "mallee" roots and stumps, generally agreed to be 12 1/2 per cent. The initial cost of the machinery, £760, may appear to be high

but for the same reasons it is regarded as essential. Secondhand machinery is rarely obtainable or worth purchasing and the alternative of having work done by contract, the cost of which would be about £50 per annum, is subject to the disadvantage that the machinery may be available only at inconvenient times.

Balancing the three returns against the three costings, as based on the presumed prices of wheat, the incomes are respectively £346, £447 and £549, which will have to bear the interest and amortisation of the capital charges on the land.

The capital involved in machinery and live stock may be reckoned at £760 as already stated for the machinery, nearly £300 for the flock of sheep at 16s. per head, and £275 for 11 horses.

For assessing the capital required for the land, the best method is to assume the land as taken up from the State and worked up to its full productivity by the settler himself. Unimproved land is valued under the Land Acts between 7s 6d and £1 per acre; with charges for water supply, roads etc. the cost of land as offered to the settler frequently reaches 15s to £1 per acre. The clearing of the land from mallee by repeated rollings and burnings would occupy for a holding of 1350 acres, taken paddock by paddock, at least 6 years. Fencing must proceed at the same time, the total cost for fencing amounting to about £300. The cost of building the dwelling house and sheds will be £600. During this time few sheep can be kept and wheat yields, although some wheat can be sown from the second year, will be below the district average as fallowing cannot at first be carried out and the "mallee" shoots will continue to compete with the crop. All that can be reasonably expected is that returns may cover cost of seed, fertiliser, sundries, depreciation of machinery—very high at this period—rates, hired labour and interest on the accumulating capital charges. On the contrary these expenses will in many cases not be covered, and the deficit on the holding may become a serious charge on the enterprise.

The labour of the farmer himself may be reckoned at a general wage level of £3 per week. The following is a statement of the minimum costs which may be expected to be necessary to bring the farm to full production:

Land, 1350 acres purchase price at 15s. per acre	£1013
6 years labour at £156	» 936
House and buildings	» 600
Fencing	» 300

£2849

Charging interest at 6 per cent. on the £2849 of improved land and the £1035 of machinery and horses, the annual interest will be approximately £233, leaving net labour incomes of £113, £214 or £316 according to the three prices indicated of wheat, allowing nothing for amortisation of capital which at 1 per cent. would absorb £39.

One of the three above sums thus represent the cash recompense the farmer has for his labour. With the help of his family he may be able to make a small sum from poultry, and be able to keep one or two cows and provide his household with dairy produce. He lives rent (and rates) free. It will be clear that with wheat at 3s. 6d. a bushel at country stations the enterprise is not worthy of consideration, while even at the higher price it is not better than a "marginal proposition". An all round de-

crease in costs of 10 per cent. together with a decrease in interest rate from 6 to 5 per cent. would only make a difference of about £100 to the labour income, and with wheat at either of the two lower levels the operations would still be "marginal". It is of course conceivable that some additional knowledge of the factors determining wheat yields may eventually prove to be a turning point for the newer areas as regards profit capacity, just as was the discovery of the value of superphosphate in the case of the older.

Other areas not at present under arable cultivation in Victoria are those not yet settled or used for grazing in certain geographical zones of the State which may be grouped as follows: the northern plains, the upland country of the Dividing Range, the dairying areas of Gippsland, and the plains of the Western District. In these zones is to be found settled land, land capable of settlement and land which for natural causes cannot be settled for many years to come. The settled land includes some already under arable cultivation or fruit-growing (in many cases irrigated), a considerable amount of dairying land, and land grazed by sheep. As regards the dairying areas which are to be found in each of these regions, it may be noted that although some of the land so employed is suitable for arable cultivation, the area of such land is quite small as compared with that of, say, the dairying districts of Western Europe, and it seems probable that these lands cannot be on any large scale diverted from their present use to wheat or other arable cultivation, although some release of land for the plough may follow on an intensification of grassland cultivation. On the other hand expansion of the arable area is more practicable in those regions of moderate rainfall where attention has so far been mainly devoted to sheep. This change of the farming system is however dependent on several factors, including the price of labour and of wheat. This is also true of any advance of arable cultivation over areas so far still uncleared.

The conclusion is that the forces determining the extension of arable cultivation in Australia as elsewhere are economic.

C. H.

WADHAM S. M. (Prof.). *The Boundaries of Arable Cultivation in Victoria*. Melbourne University Press 1930. Reprinted from the *Economic Record*, May 1930.

BIBLIOGRAPHY ON ECONOMIC AND SOCIAL QUESTIONS

BROOMHALL, G. J. S. and HUBBACK J. H. *Corn Trade Memories, Recent and Remote. XVIII-XX Centuries*. Liverpool, 1930.

[This volume is primarily a record of the origin and progress of the Liverpool Corn Exchange with biographical notes on the principal personages engaged in the grain trade in connection with Liverpool since about 1840. Considerable general and even economic interest attaches to the writers' detailed account of the earlier conditions of the grain trade, when cargoes were brought to Great Britain in vessels of not more than 2000 tons, and business in Californian and Chicago wheat had to be transacted by letter. The laying of the Atlantic cable was the signal for the initiation of modern methods, while the much more recent introduction of the practice of overside delivery of bulk grain into barges for transport to mills did much to change the character of the trading. It is noted that the supplies of Argentine wheat and maize only became important during the last decade of the nineteenth century.]

The chapter on the development of the British flour-milling industry is of special interest. It traces the transfer of the industry from the numerous small mills, worked by wind or water and from time immemorial associated with the wheat growing

districts of England, to the new roller mills constructed at the ports for the handling of overseas grain, with consequent concentration in the hands of a few large firms.

Tables showing wheat prices during five centuries are a unique feature. The yearly averages from 1401 to 1655 are based on the figures relating to the Corn Market of Strassburg, one of the most important of the markets of mediaeval times. For the period 1656 to 1861 the annual averages are those of English wheat, and for the last 61 years up to 1929 the prices of Good Red Wheat in Liverpool are adopted. While acknowledging that comparison of monetary values over such periods must be a matter of uncertainty, the writers maintain that the record of fluctuations from year to year is none the less of much interest. The figures as they stand would seem to indicate that circumstances may bring about at any time fluctuations in wheat prices amounting to 400 to 500 per cent. above the lowest average, and that this has been a recurring phenomenon, a fact not without significance for the present crisis].

SWANSON, W. W., and ARMSTRONG, P. C. *Wheat*. Toronto. The Macmillan Company of Canada, Ltd. 1930, Pp. viii + 320.

[The title of this book might give the impression that it was a treatise on wheat in general, whereas it is an account of wheat-growing in Western Canada and of the Canadian wheat trade. Those important subjects are, however, treated in all their aspects. The story is told how Western Canada was opened up for settlement and the cultivation and harvesting of wheat under pioneer conditions are described. We are told how the wheat trade developed, how elevators were built, how a great grain market arose in Winnipeg, and how a wonderful railway system was built up largely with a view to the transport of wheat to the ports at the head of the Great Lakes and on the Pacific Coast. The routes by which the wheat reaches the Canadian ports or the American Atlantic ports are indicated and the possible results of improving the St. Lawrence Waterway, so as to provide a single deep channel from the Head of the Lakes to the sea, are discussed. So also are the results likely to follow from the building of the Hudson Bay Railway and the opening up of a new sea route to Europe. The distribution of Canadian wheat throughout the world is traced and a chapter is devoted to milling in Canada and its probable future development.

The authors deal at length with the methods by which wheat is sold and describe the growth of co-operative marketing, culminating in the formation of the Wheat Pool. The system of grading is described and on the vexed question of the mixing of grades the authors express the view that with the coming of the Pool the reasons for objecting to the mixing of grades have lost much of their force, since any profit that may result from it will return to the producers.

The book was finished towards the end of 1929, before the great fall in wheat prices had occurred, and the authors were optimistic about the future of grain-growing in Canada. In a note written in February 1930, as the book was going to press, they state that they saw no reason to modify their conclusions. The situation has changed since then, but the fall in prices does not greatly affect the reasoning on which the authors base their confidence in the future and their optimism may yet be fully justified.

The book does not deal merely with the economic aspects of wheat-growing. It shows the part which it has played in building up new homes and new communities in what was known not many years ago as "The Great Lone Land". Not the least interesting part of this book is its discussion of the effects of pioneer conditions in developing individual character and fostering community spirit].

MOELWYN-HUGHES R. *Cheap Bread*. London, Ernest Benn. 1930, pp. 56 with statistical appendices.

[This brochure is an analysis of the present position of the grain trade, more especially as affecting Great Britain and the British consumer, but also in its wider international repercussions. The case is put from the point of view rather of the trader than the grower, and the writer is in favour of a policy of non-interference with the trade, whether by Farm or Import Boards, or by growers' combines and pools. The account given of the conduct and methods of operation of the grain trade is comprehensive and is of interest apart from any conclusions drawn.

Full weight is given to the present problem of the exceptionally large exportable surplus of wheat, but it is pointed out that even under the most favourable conditions market fluctuations are inevitable from the large number of factors of different kinds influencing both production and demand. Price stabilisation, unless understood as

being within certain limits, is viewed by the writer as impracticable. Stress is laid on the place of the merchant or trader as the essential intermediary between grower and miller the system of future delivery trading is explained and its function in affording security against loss from falling markets during transit from grower to miller-consumer is made clear.

A point of some interest in connection with the question of any national control of wheat imports is that such control cannot be made effective for wheat alone. As was found during the war period, the purchase, sale and distribution of the other cereals and even of cereal substitutes must also be nationalised, and this is the more true now that wheat has become a feed for stock and poultry. The machinery for enforcing control on this scale would be likely to become extremely cumbersome and costly.

The appendices contain statistical information on world wheat production, wheat and flour exports and imports, and bread prices].

HOFFMAN G. WRIGHT. Trading in Corn Futures. *United States Department of Agriculture. Technical Bulletin No. 199. October 1930.*

[This study is an analysis and summary of information relating to future trading in corn, *i. e.*, maize, in the United States over a five year period ending 30 September 1928. Regulations under the Grain Futures Act of 1922 came into force in June 1923, and since then daily reports of all grain future trading have been received. Of the total volume of trading on all markets of the United States, trading in wheat futures accounted for 62.2 per cent and averaged 46,120,000 bushels each day. Corn (*i. e.* maize) futures come next in importance with 27 per cent. of the total volume, but taking the principal market, the Chicago Board of Trade alone, the proportion is rather higher. A very full tabulation and analysis of the trading in corn futures, and of relation of commitments and deliveries to price movements are given].

AGRICULTURAL LEGISLATION

The Legal Concession of Patents for New Varieties of Plants.

This problem was the subject of a report presented by M. HENRY, Delegate of Belgium, at the October session of the Permanent Committee of the International Institute of Agriculture. In this report the author explained and illustrated on the basis of the relative congressional papers, a bill introduced in the United States granting *patents* for new varieties of plants; this bill was approved with slight modifications proposed by the Patents Commission, and was voted by the House of Representatives on 23 May 1930.

Under this law the breeder who produces a new variety of crop plant can receive a patent only for *its vegetative reproduction*, and even this right is limited as reproduction by tuber is excluded.

The reasons which have prompted this limitation of the patent are obvious. It is not possible in practice in the vast sphere of agriculture to control, as would be implied by the grant of a patent, the use of a variety which is propagated by means of seeds or tubers that is to say, by propagating material which is currently sold either as food products or raw material used in industry.

In these circumstances this Act of the United States Congress can only be expected to serve the practical purpose for which it was passed in addition to that of fair dealing — namely to *stimulate farmers and agricultural experts to discover and create new and good plant breeds or varieties*. In Italy and probably in all countries the majority of plant breeders would receive no protection from a patent law similar to that of the United States.

It is not proposed to speak here of the wide possibilities for fraud which are left open by the patents granted in the United States even in the cases of plants which

are propagated vegetatively. We shall merely recall the many serious difficulties which the Patents Bureau will have to overcome in order to arrive at the essential exact ascertainment of the "newness" of the plant. It has already been found indispensable to engage special experts and the Ministry of Agriculture has undertaken to supply these to the Patent office from its own technical staff. The Ministry has also undertaken to supervise the *special laboratory and field research and investigation* which may be necessary for the same purpose.

In brief the application of the patent in the conditions laid down by the law appears open to criticism for the following reasons:—

1. Because it introduces a disparity of treatment as between plant breeders, leaving unprotected those who work with varieties which are propagated by seed ;

2. Because even in the case of varieties which are propagated vegetatively (*i. e.*, those very varieties for which patents are obtainable) it will be easy to bring about without fear of detection a fraudulent reproduction of the individual specimen in the possession of the breeder.

3. Because the patent cannot, supposing the undertakings imposed to be scrupulously observed, fail to render more difficult or at least more slow, the diffusion of good varieties, with a consequent loss to agriculture far outweighing the "benefits" which the "discoverer" can hope to gain ;

4. Because lastly the Patents Bureau which is primarily concerned with inventions of an industrial character cannot be a suitable centre, however extensively supplemented, for providing the material, the skilled staff and the investigations which are essential to a department dealing with cultivated plants.

The fact that the patent only in part fulfils the objects of encouragement and protection proposed, and the serious difficulties referred to which arise even in cases where its application would appear possible, necessarily point to the search for a different solution of the problem which would result in a measure whereby all breeders will benefit in whatever sphere they work.

Assuming that direct State intervention is necessary it might be found advisable to impose a small tax to be collected by means of special marks or in some other way, payable when the plant propagating material — whether of sexual or asexual nature — recognised as constituting a "new" or "select" variety reaches the ordinary farmer from commercial firms, agricultural co-operative organizations or directly from the breeders. Or a tax might be charged, of a still smaller amount in view of its vaster field of application, on the yield given by the selected variety at harvest time.

In Italy, for instance this tax might very conveniently be levied on the basis of the wheat threshing certificates which, for statistical purposes, must be handed to the *Cattedre ambulanti d'Agricoltura*.

The revenue from these or similar small taxes — naturally varying in amount from one year to another — should be equally divided by the State, in each year, between the different plant breeders, whether institutions or persons, in proportion to the part taken by the respective varieties in the seeds trade or in the trade in material for vegetative reproduction.

Although such a solution would ensure that all plant breeders receive the reward they merit, and would thus bring about the desired general stimulus to the "invention" of new varieties, it must be recognised that it is one that is far from being capable of realisation either speedily or easily.

Hence in the opinion of the writer there is no course open other than to abandon all these specific and direct methods, and to follow the lines of policy marked out

first by the Italian Government when in 1925 it marshalled the forces for the Wheat Campaign, adapting the method as may seem opportune.

It may be useful here to restate the view that as a rule the investigation and production of the new varieties must be the function of special *Institutes*: Plant-Breeding, or to use another designation, of Applied Plant Genetics. Outside the orbit of these institutes, especially in Italy, the activity of individual investigators is very limited; and the results obtained are small, and even sometimes, as will be later pointed out, unreal, owing to the want of preparation for the selective, or as it may be called genetic, work, combined often with but scanty financial and other means available.

Since the essential object of the movement which M. Henry desires to promote is the *improvement of breeds of the plants* for cultivation it might be said that the most complete and speedy contribution to this end should be made by the work of such Institutes. And since it is a question of encouraging and rewarding adequately an activity which has far-reaching influence on the increase of national production — of direct or indirect advantage to all classes — it seems indisputable that in every State provision should be made from the public funds for the installation and upkeep of these institutions which perform a service of public utility.

Work on these lines has been recently inaugurated in Italy and is in course of development — in particular, up to the present, in cereals, to the great satisfaction of the farmers who find that the new selected varieties reach their farms in ever increasing proportions each year, without risk to themselves and with protection against any immoderate speculation. Tangible proof of the interest and satisfaction of the farmers is given, *inter alia*, by the contributions voluntarily made by agricultural organisations, such as the Italian Federation of Agricultural Consortia (*Federazione Italiana dei Consorzi Agrari*) and others, and even by individual farm undertakings to the expenses of establishment and working of the Institute of Cerealiculture at Bologna. This institution has for ten years past devoted its activities to the production of selected breeds of the most important cereals in Italy and to the improved utilisation of these.

The regular working of the Plant-Breeding Institutes in the service of agriculture renders superfluous a special Office of Registration of Plant Breeds, such as exists for instance at Brno or at Edinburgh. The Institute itself, in order to maintain its reputation if for no other reason, will certainly assure itself from time to time by every means suitable of the real merit of the varieties produced. And even on the supposition of a possible error of judgment by which a variety of poor value enters ordinary cultivation, the mistake would be speedily corrected and the breed relegated to obscurity.

Better than any general Patents Office, these Institutes can function as archive offices, that is to say they can form a register of "new" varieties or breeds founded by non-official *plant breeders*. Such registration would be given only after the Institute has ascertained, on full enquiry, the "newness" of the breed, and its superiority in respect of breeds of the same type which may have preceded it in general farming use. It may be added that even at present they occasionally function, if not precisely for registration, for recognition of new breeds.

Two cases, among others less recent, may be mentioned of "registration" at the Bologna Institute.

Case I. — We have been able to recognise without difficulty the "Carlotta Strampelli" in a wheat which of recent years was widely diffused in the Reggian

Apennine, under the name of "Spigone", or even of "Bismantova" wheat from the place in which the first representative of the "new" variety was found.

Case II. — In "Rietone" which has been diffused not less widely for some years past in the Modena Apennine, it has been possible to recognise quite clearly our own breed *Undici*.

Enrolment on the staff lists of the Plant Breeding Institutes, whether State or semi-official, ensures to the *official plant breeders* emoluments and privileges commensurate to the scientific and technical qualifications of each, and to the work done by them. Money prizes — to be awarded from a special fund allocated on the budget of the Ministry of Agriculture in close conjunction with that assigned for agricultural experiment — diplomas of merit and some token of honour, would stimulate and adequately reward the activity of *non-official plant breeders* who were "inventors" of the breeds registered.

A special Law, or even the simple addition of an article to the Royal Decree Law of 15 October 1925, No. 2033, — which prohibits adulteration or fraud in the preparation and in the trade in materials for agricultural use and in agricultural products, might *usefully and fairly recognise as fraud the sale — without due authorisation — of propagating material, whether asexual or sexual, of select plant breeds.*

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MONTLHY BULLETIN

OF

AGRICULTURAL ECONOMICS AND SOCIOLOGY

LAND SYSTEMS

The Agrarian Reform in Rumania.

« Lorsqu'une réforme est devenue nécessaire et que le moment de l'accomplir est arrivé, rien ne l'empêche et tout la sert. Heureux alors les hommes s'ils savaient s'entendre, si les uns cédaient ce qu'ils ont de trop, si les autres se contentaient de ce qui leur manque ! Les révolutions se feraient à l'amiable et l'historien n'aurait à rappeler ni excès, ni malheurs, il n'aurait qu'à montrer l'humanité rendue plus sage, plus libre et plus fortunée ».

F. A. MIGNET 1838.

INTRODUCTION.

Rumania is situated in the South-East of Europe, between 43°38' and 49° Latitude N., and between 18° and 29° longitude; its frontiers adjoin Hungary, Czechoslovakia, Poland, Ukraine, the U. S. S. R., the Black Sea, Bulgaria and Yugoslavia.

Rumania consists of four provinces; the Old Kingdom, Transylvania (1), Bessarabia, and Bukovina; it occupies an area of 294,892,000 hectares with a population which probably amounts to 17,595,000 inhabitants (2) of which 81.70 per cent. is rural, and 18.30 per cent. urban. The population is distributed among the provinces as follows:

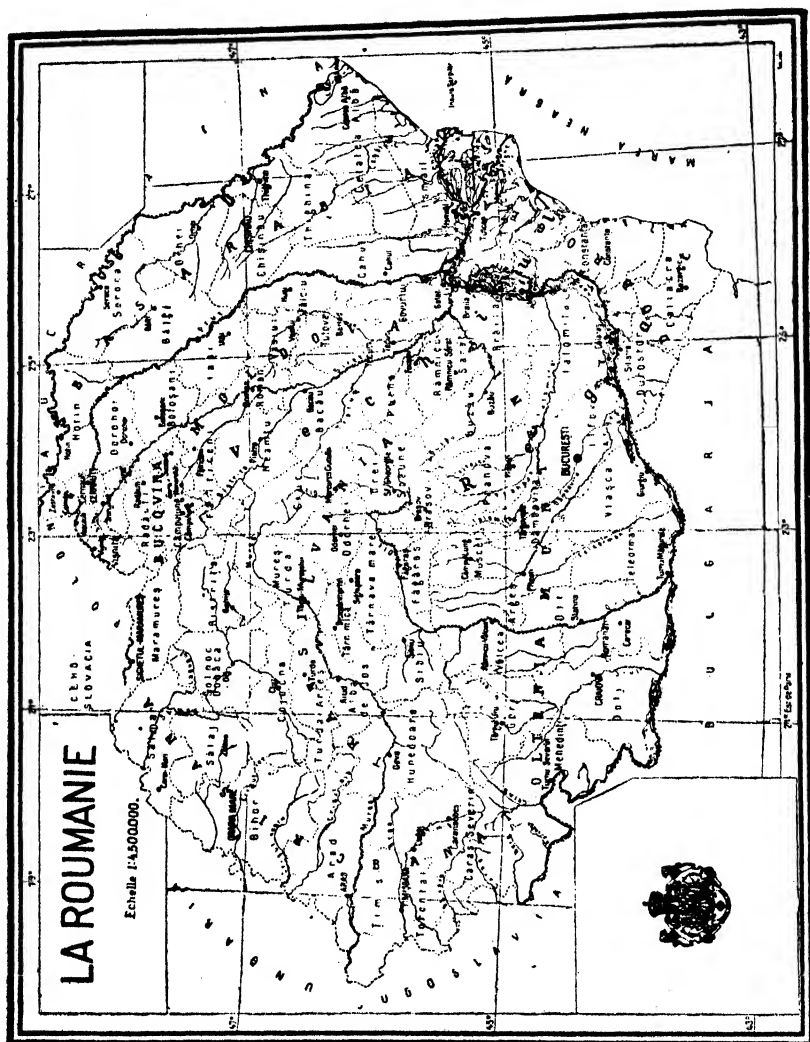
	Urban	Rural
The Old Kingdom	18.60 %	81.40 %
Transylvania	18.44 %	81.56 %
Bessarabia	14.51 %	85.49 %
Bukovina	21.62 %	78.38 %

The rural population is thus predominant in Rumania and the main occupation is that of agriculture and stock-farming.

From the agricultural point of view the total area of Rumania was in 1929 divided as follows:

(1) Throughout this article the provinces of Transylvania proper, Banat, Crishana and Maramouresh are designated under the name of Transylvania.

(2) The census is in course of being taken.



Arable lands	13,010,989 hectares
Natural meadows and pastures	4,054,474 "
Shrubs and bushes	613,614 "
Woods and forests	7,224,071 "
Marshland, heaths, waste lands, productive and unproductive	4,586,051 "

Total . . . 29,489,200 hectares

The arable land represents 44.12 per cent of the total area of the country. If the distribution of the area of the arable land in 1929 is compared with that in 1914 (1) the following table is obtained :

	Arable Lands	Cereals		Artificial meadows other forage crops		Food crops		Industrial crops		Fallow	
	ha.	total ha.	%	total ha.	%	total ha.	%	total	%	total	%
1914	6,113,000	5,296,000	86.63	576,000	9.41	124,000	2.02	118,000	1.94	—	—
1929	13,010,989	11,222,522	86.25	655,672	4.98	417,108	3.27	365,780	2.81	349,007	2.69

Hence at the present time cereals occupy 86.25 per cent of the total area of the arable land.

Taking the most important cereals in the order of importance the figures of area are as follows :

Maize	4,794,952 hectares	or 42.73 per cent.
Wheat	2,737,146 "	24.39 " "
Barley	2,053,537 "	18.30 " "
Oats	1,212,700 "	10.80 " "

In addition to the quantities required for home consumption, there is a large export of cereals from Rumania, the value of the export of cereals representing more than 33 per cent. of the total value of the exports.

Stock-farming occupies also a very important place. The area of the pastures and grass lands including the area of forage crops in 1929 was in all 4,710,147 hectares, or almost one-third of the total area of arable land.

The figures for livestock in Rumania in 1929 may be shown as follows :

Horses 1,958,508 head with a density of 6.6 head per square kilometre and 112 per thousand inhabitants.

Cattle 4,334,441 head with a density of 14 head per square kilometre and 247 per thousand inhabitants.

Sheep 12,406,428 head with a density of 42 head per square kilometre and 708 per thousand inhabitants.

Goats 372,807 head with a density of 1.2 head per square kilometre and 21 per thousand inhabitants.

Pigs 2,414,498 head with a density of 8.1 head per square kilometre and 157 per thousand inhabitants.

According to statistical data (2) Rumania is capable of exporting annually : 300,000 heads of cattle, 500,000 sheep, 500,000 full grown pigs, 50,000,000 kilogram-

(1) In the old Kingdom.

(2) Dr. G. JONESCO BRAILA. La Roumanie agricole, page 189.

mes of young pigs, 5,000,000 kg. killed poultry, 20,000,000 kg. eggs, 200,000 kg. butter and 1,000,000 kg. various cheeses.

The average value of the agricultural production, taking plant and animal production together, amounts to 116,900 million lei, to which may be added the value of forest products, 5,200 million lei, giving a total of 122,100 million lei for the agricultural production as compared with a total of 39,000 millions representing the value of the industrial production.

If it be taken into account that more than 81 per cent. of the population belong to the peasant class, and that since time immemorial this population has been the motive force of agriculture, it is clear that their conditions must have for long past engaged the attention of the rulers of the country and that a wide measure of agrarian reform was imminent.

CHAPTER I. — THE AGRARIAN PROBLEM IN RUMANIA.

A. — *The Old Kingdom.*

The problem of agrarian reform has in recent years engaged the attention of almost all European statesmen ; and among the agrarian reforms which have been effected in the countries of Eastern Europe that accomplished in Rumania is without doubt one of the most remarkable both in the far-sighted spirit that inspired it and in the courage with which it was carried out. Some account will be given here of the determining causes of the far-reaching reforms effected in each province, of the principles on which these were based, the method of execution and the results.

The problem will first be examined as it occurs in the province of the Old Kingdom, since it was in that province that the first impulse was given to reform, even before the war, in 1913, when the question was merely one of the precarious situation of the peasant class in Rumania.

In Rumania, as everywhere else, the land from the most remote times belonged to the peasants; the proof of this fact is in the "*rdzeši*" of Moldavia and the "*moşneni*" of Wallachia. In the XIII and XIVth centuries (1), at the time of the foundation of the principalities, the institution of serfdom made its appearance ; the peasant was bound to the soil and began from that time to pay a tithe to his most powerful neighbour ; this was the origin of the relations between the peasants and the landowners, relations which were at first the expression of a mutual understanding of a kindly character but which later became binding.

At the time that the Principalities became tributary to Turkey the demands of Turkey increased from year to year and as it was the peasants who paid the heavy taxes imposed they saw themselves overwhelmed by debts and obliged to sell their lands to the "boyards", or landowning nobles. These latter thereby were enabled gradually to consolidate their estates while the peasant, as his land, *i. e.* his sole means of subsistence, gradually melted away, found himself obliged to become bound to the landowner if he was to secure a livelihood from one day to the next. It was in this way that serfdom became as it were imperceptibly law, and finally as the result of a whole series of compulsory tithe payments -- such as : the "*dijmăritul*" (the tenth of the produce of the bee hives) the "*sfertnăritul*" (the personal tax fixed by the lord), the "*Gostinăritul*" (tax on pig dealers), the "*vacăritul*" (on cows), the "*oieritul*" (on sheep), etc., many peasants left the country and passed to the other side of the Danube.

(1) НѢЗНОВЪ. History of the Rumanians. Vol. I, book II, chapter I.

In 1746, the Prince of Wallachia, Constantin Mavrocordat, took note of this situation, summoned the General Assembly and enacted that all peasants who should return to Rumania should be exempt from the taxes for six months, should have the right to settle on such lands as they pleased, and should be obliged to give forced labour on the lord's domain only for six days in the year. Finding that this measure did not have the desired effect, the prince in the autumn of this same year declared that they should in addition have the right to move from one land to another on payment of a tax of 10 lei per head; in 1747 Constantin drew up what is known as the Agrarian Statute, by which it was enacted that the "clacasi" (serfs liable to forced labour) had to give from 8 to 12 days yearly by agreement with their lords and that in return the lord was obliged to give the serfs arable land, pasture for their livestock, and wood for fuel and building, etc. This decree, in fact, rather strengthened the rights of owners over the land (1).

In 1749 Constantin Mavrocordat gave these same rights to the peasants of Moldavia, fixing the days of forced labour at 12, as for Wallachia.

The landowners who were dissatisfied with this number of days made representations to the princes, and in 1766, Gregory Glyca, on the request of the landowners, fixed the *quantum* of work which had to be given by the peasant in the different cases, a *quantum* which in fact greatly exceeded the actual work capacity of a man (2).

On 28 May 1768 Gregory Calimaki (3) fixed for the peasant his right to cultivate, on the estate on which he lived, an area of land sufficient for his own livelihood without hindrance from the owner. In return he must pay a tithe and give the owner 12 days work in the year.

In 1777 Gregory Glyca added two days more to the number of days' work, and obliged the peasants to do the repairs to buildings, ponds and mills.

In 1792 Alexander Moruzi took away from the peasants the right to gather wood in the forests and imposed on them for the first time the obligation of giving to the owners of the forest a tithe of the wood cut, it being understood that no further tithe was to be levied on dead wood.

In 1794 Michel Soutzo accorded to the peasants the right to apply for land, through the prefect, and to obtain arable land and pasturage in exchange for payment of a tithe.

In 1805 Alexander Moruzi in Moldavia added another two days to the days of forced labour and enacted for the first time that the peasant could use only one *falce* (4) of pasturage and grassland for each animal, the head grazed not to exceed 16 head between the Pruth and the Dniester, 12 head between the Pruth and the Sereth and six between the Sereth and the mountains.

In Wallachia the peasants had full right over the lands that they were occupying up to the time of the Organic Statute (5).

According to N. Soutzo the labour imposed on the peasants by the laws of Alexander Moruzi was estimated at from 36 to 40 days per annum.

It is obvious that the number of these days very quickly became larger and that the free peasant was soon transformed into a serf who was not merely no longer master of his own time but had not enough to meet his needs and those of his family.

(1) G. IONESCU-SISESTI. *Politica agrara*, p. 72.

(2) RADU ROSETTI. *Pentru ce s'on rasculat tarain*, p. 18.

(3) BASILESCO. *Réforme agraire en Roumanie*, p. 108.

(4) 1 *falce* = 14,322 square metres.

(5) RADU ROSETTI. *Op. cit.* p. 25.

It was this state of things that brought about in Wallachia the revolt of Tudor Vladimiresco in 1821, a revolt which was declared by him to be specially directed against the oppressors of the peasant.

In 1826 the Treaty of Adrianople gave self-government to the two principalities of Moldavia and Wallachia, and in addition the right to have their *Domni* or landowner prince placed under the protection of Russia and Turkey. A new era thus began for the two principalities, agriculture becoming more remunerative.

Although the peasant found the number of his days of forced labour were increased, he hoped that the right of electing his *Domni* would mean an amelioration of his lot. But these were vain hopes, for in 1828, Ioniță Sandu Sturza bound the peasant once more to the soil, restricted his rights of working an area of land sufficient for his own needs and those of his family, as well as the right to pastureland and grassland, and reduced to two-thirds the area of the land assigned to the peasant in usufruct, while the other third remained in full possession of the landowner.

As will be seen, the situation was by no means clear, and the relations between the two classes were very strained.

Under pretext of regulating the relations between the two classes the *Organic Statute* came into being which bound the peasant absolutely to the soil; the landowner was obliged to allow him a portion of land for which the peasant had to make a return in the performance of all kinds of work. This settlement then established the rights of ownership of the lord over the land, while the peasant remained quite simply a slave. In the preparation of this Statute the peasants took no part; the extraordinary General Assembly of Revision which had to approve the Statute drawn up by the two Committees, one for each province, consisted of 52 persons, 42 of whom were *boyards*, that is to say, landowners, a Metropolitan and the two Bishops concerned.

In Wallachia, the *Organic Statute* was applied in the course of 1831 and in Moldavia on 1 January 1832. The very severe provisions included as regards agrarian questions gave rise to a series of discontents which would have brought about a revolution if Kiseleff (1), an enlightened and democratic spirit of the time, influenced by the younger generation of Rumanians who were returning from France full of generous ideas of the Great French Revolution and that of July 1830 had not suspended the application of the Statute, as regarded the provisions for the relations between the owners and the peasants.

In spite of the opposition of Kiseleff, the *Organic Statute* was voted by the General Assembly of 9 March 1833 and thus it was that the peasants on this occasion also remained at the mercy of the landowners who profited by the fact to the full.

This was the state of affairs in 1848 in the Principalities, and it is easy to understand how the liberal ideas which came from the West were at once hailed and why the first act accomplished by the revolutionaries of Wallachia was, in their ignorance and enthusiasm, to burn the text of the *Organic Statute*.

One of the results of the Revolution of 1848 was to establish for the first time in Rumania the right of the peasant to become landowner. The National Assembly of 12 August 1848, after having admitted this right in principle, proclaimed the sacred right of property and at the same time the liberty of the worker. This memorable sitting, so to speak, buried the past and inaugurated a new era.

(1) The Treaty of Adrianople having instituted the Russian Protectorate over the two Principalities, Kiseleff was sent by Russia in the capacity of representative.

In Moldavia, unfortunately, the movement was stifled from the beginning.

The first improvements in the relations between peasants and landowners are due, in Wallachia, to the reform of Barba Stirbey who in 1851 modified the *Organic Statute*.

This reform fixed the number of days of compulsory labour and at the same time abolished the various liabilities to forced labour expected to be rendered personally by the peasants.

At the same time the area of pasturage assigned to each animal was doubled and the peasant was exempted from paying a tithe on his garden to the landowner.

A measure which on first sight seemed to be in favour of the peasant was that which modified article 144 of the Organic Statute and stated that the peasant is absolute master of his person and his property, and that he is free to move his abode and to work wherever it suits him ; this freedom was however illusory for, in fact, he was shackled by a whole series of formalities and could profit but very little by this semblance of liberty. Once again, the right of the peasant to own the land that he worked was disregarded.

Some years later the Paris Conference of 1858 decided the fate of the people of Rumania and the union of the two principalities into a single State with two princes was arranged. A way out was found of this decision by the fact that a single prince, Prince Couza, was elected for the two principalities at the meetings of 5 and 24 January 1859, when the Union was proclaimed.

The Paris Conference dealt, *inter alia*, under art. 46 with the question of ownership ; it was stated in this article that the expropriation of property could only be effected under a law, for reasons of public utility and only with compensation payment. It stated also that all the privileges enjoyed by certain classes should be abolished and that steps should be taken to revise the law which regulates the relations between landowners and peasants, this with the object of improving the situation of the peasants. The revision of this law was entrusted to a committee, known as the " Central Commission " which met at Focsani, a town situated on the borders of the two principalities.

During the whole of this period the struggle had been severe ; on the one side the all powerful landowners saw with terror the moment approaching when all their privileges and even their property would be reft from them, and on the other there was the peasant class, unorganised, uneducated, but joyfully hailing the dawn of their liberty. The representatives of the peasants brought their complaints to the ad-hoc *divan* or assembly of Moldavia on 9 November 1857, saying to each other some such words as these : " Up to the present we have borne all the charges, and in exchange we have enjoyed no advantage, while others, who have been subject to no days of labour, have had all the profits ; we have paid the heaviest taxes ; we have supplied the army with men ; we have paid for the upkeep of the magistrate the police, the prefects, and we have laboured at the bridges, the high roads and the railways. All the days of forced labour and the days of service with the *boyard* have fallen to us, the agent of the owner has sucked our strength, has made us drink of a poisoned drink all too dear, and eat of black bread soaked in our tears and the sweat of our brow. When the country was invaded by foreign armies it was we who fed them, who worked for them, who gave them transport, for the all-powerful, the rich, immediately crossed the frontier and left the country to return later when order was reestablished, to enjoy their privileges once again, to oppress us and to disregard our sufferings, ours, who had been the guardians of the country and of our homes ". They demanded that a general assembly should

be constituted in which they should have their own representatives and that this assembly should examine and discuss their rights and those of the *boyards*. "The country shall decide" they cried, "what we have to pay and we will pay it with the sweat of our brows". The representatives of the landowners, large and small, replied with a whole series of objections to the demands of the peasants and the only concession made to them was that they were allowed the right of coming to an agreement with the landowner on the subject of the payment of work, the rent of the land and if need be the selling price of the land.

The *divans ad hoc* did not reach any conclusion and the questions were referred to the Central Committee at Focsani. Three legislative proposals were presented to that committee which amalgamated them into one and this was passed on 28 July 1860.

This law did not give the hoped for results and brought no improvement into the relations between the two classes. The peasant remained landless and only obtained the right of selling his own labour, or at most that of renting a parcel of land at a price agreed with the landowner; otherwise he remained at the disposal of his master.

The two general assemblies of Jassy and Bucarest, constituted in virtue of the Convention of Paris, were anxious to reach a better solution of the question, and decided to meet at Bucarest as a single meeting. This was held in May of 1862 and it was on this occasion that Michel Kogalniceanu delivered an admirable address in the capacity of protector of the rights of the peasant. The land owners were represented by Barbu Cetargi, President of the Council of Ministers. The discussions were violent, the arguments for and against were canvassed. On 1 June of that year Kogalniceanu laid before the assembly a counter-proposal signed by 22 deputies; the project was rejected by 62 votes against 32, and some days later the proposal of the central commission of Focsani was passed by 62 votes against 35. The side of the great landowners triumphed once again. But before long fortune came to the aid of the peasants.

On 12 October 1863 Prince Couza entrusted Michel Kogalniceanu with the formation of the Cabinet, and on 11 December, he submitted the proposal for the secularisation of the property of the monasteries, the bill being passed by a large majority; but when some time after he submitted a proposal for rural legislation a vote of censure was passed on his speech and the bill was rejected. Kogalniceanu presented his resignation but Prince Couza, far from accepting it, prorogued the Chambers and dissolved them on 2 May. On the same day the prince issued a proclamation calling upon the people to decide itself, by means of a plebiscite, on an electoral bill and on a proposed statute for giving further force to the provisions of the Convention. The result of the voting was 683,928 for and 1,307 against the proposals.

It was thus with the will of the people as the basis that Prince Couza, by the decree of 2 July 1864, presented to the State Council for examination the proposal for rural legislation, a law which was finally promulgated by the Prince on 14 August 1864. On the same day he issued a proclamation to the people in which he indicated the importance of this law and gave the people the general lines that would have to be followed thenceforward. He then told them that the days of forced labour were for ever abolished, that the peasant was now the free owner of the land worked by him for an area to be decided by the laws in force, and finally that all the compulsory bonds between peasant and landowner were abolished and redeemed by the payment of compensation. He addressed them as follows: "You are from henceforward the masters of your own powers of labour.

Each of you has his own corner of land which is your sacred property, and you have a country to love and to defend." He exhorted then never to give up their labouring occupation for that is the true source of wealth. "Show them", he added, "that in Rumania, as everywhere else, free labour produces twice as much as compulsory labour can; far from giving yourselves up to idleness make your work tenfold, cultivate your land better for it is yours henceforth; it is your property and it will be your children's after you". He went on to say: "In future you will have no relations with your landlords other than those based on common interests, rights and duties must be reciprocal. See that they are based on love of your neighbour and trust in him. Learn that the landowners were many who desired to ameliorate your lot".

After some further words of advice, the Prince concluded by saying: "And now, my friends, enjoy your lands in peace and work with a will, for work alone can restore and enrich them; and may Heaven bless the seed that you cast on the first furrows of your fields" (1). The wise care for the people displayed in this proclamation and the impression made on them can still be judged from the fact that even to-day after 66 years the name of Couza is pronounced with devotion. It was by him that the foundations of the modern Rumania were laid.

By the agrarian law of Couza justice was done to the peasant and the right of ownership of the land he cultivated was conceded to him. It was however enacted that in no case could more than two-thirds of the domain be expropriated and that forests were to be excluded from expropriation. The area to be assigned to each peasant, in addition to the site for dwelling house and stabling for his beasts, was fixed by the law. Thus the assignment was as follows:

in Wallachia:

- for peasants owning 4 oxen and a cow 11 pogoane (1).
- for peasants owning 2 oxen and a cow 7 pogoane and 19 prăjini (2).
- for peasants owning one cow or working with the 4 pogoane and 15 prăjini.

in Moldavia:

- for the peasant owning 4 oxen and a cow 5 falchi and 40 prăjini.
- for the peasant owning 2 oxen and a cow 5 falchi.
- for the peasant owning one cow or working without beasts 2 falci and 40 prăjini.

in Bessarabia (3):

- for the peasant owning 4 oxen and a cow 6 falchi and 30 prăjini (4).
- for the peasant owning 2 oxen and a cow 4 falchi and 30 prăjini.
- for the peasant owning one cow or working without beasts 2 falchi and 70 prăjini.

In the case of peasants not possessing this specified area of land, the law provides by a special clause, that the difference be made up.

In the case of peasants not holding land on any estate, land was assigned to them out of the State lands. Regard was also had to the case of childless widows,

(1) Rural Law with the proclamation of the reigning prince at Couza in 1864.

(1) One pogon = 5000 square metres.

(2) 24 prăjini = one pogon.

(3) By the Treaty of Paris, in 1856 the three departments of the South of Bessarabia, Ismail, Bolgrad and Cahal were restored to Moldavia by Russia, which in 1812 had annexed the whole of Bessarabia.

(4) One falce = 14322 m²; 80 prajini = one falce.

of disabled persons, and of persons who not being of the farming class were in possession only of the land on which their houses or stabling stood; the right of ownership over these sites was recognised, the exact area being fixed by the law in each principality separately.

Art. III of the law provided that in no case could more than two-thirds of the land be taken and that forests were not included in the area calculated.

At the same time as it recognised the peasants' right of ownership of the lands cultivated by them, the law abolished in virtue of Article 10, for ever and over the whole territorial area of the principality in each case: "the forced labour, the tithe, the transport obligations, the days' work for repairs, dues of wood and other similar dues payable to the lords of the estates whether in kind or in money, whether established by laws, charters or other agreements temporary or in perpetuity".

Art. XXII fixed the sums which must be paid by the peasant or land owner for the redemption of these charges, sums which must be paid within a period of 15 years and at the same time as the taxes.

The general bases of the calculations were favourable to the landowners and the sum fixed, as it was to be paid annually and with interest at 10 per cent. added, proved too heavy a burden on the peasant, since the amortisation payment and the taxes represented 32 per cent. of the average income of a family (1). The inevitable consequence was that after some years, in 1874, the State was obliged to assume the liabilities of the peasants and to relinquish collection of the annual instalments.

A measure which was well-considered but which the result proved to be ineffective was that which made the rural holdings inalienable; this measure was later evaded by means of leases; in addition as none of the provisions of the law regulated the division of the lands among heirs, the lands received by the first holders after expropriation were soon so parcelled out among their descendants that the portions became in time almost impossible to cultivate.

Another oversight was that the law made no provision for the progressive increase of the rural population, and the result was that after some decades the same problem reappeared; a larger population, the lands ceded by expropriation no longer sufficing for the needs of the inhabitants, and consequently the necessity for turning once again to the large landowners. Their estates were now frequently farmed out to agents, foreigners for the most part, who had no tie to the land or to the peasants, and whose one object was to exploit the land and to work the peasant to the utmost, with a view to the highest immediate profit possible.

The problem of the common pasture grounds also was not adequately dealt with by the law of 1864, as it did not state precisely what lands should be given up to pasturage; in consequence, in many localities, the landowners gave up for this purpose the poorest lands they had, ravines, steep slopes, tops of hills often waterless and without any possible access to water for the animals.

Further the law did not state that the pasture grounds could not be parcelled out or cultivated: and consequently, in view of the growth of population and the anticipated insufficiency of arable lands, recourse was had to the communal pasture grounds which were gradually parcelled out and cultivated; it is obvious that the peasant was bound soon to come once again into dependence on the landowner or rather on his agent who would give him the pasturage necessary but on burdensome conditions.

(1) MORCIANU. The agrarian law of 1864, quoted by IONESCU SISESTI in the "Politica Agrara", p. 79.

Article IX of the Rural Law of Couza maintained the right of the peasants, granted by previous laws (art. 44 of the Mountain Law of Moldavia and art. 140 paragraph 4 of the law of 23 April 1851 for Wallachia) which authorised them to gather the wood they required in the forests; it gave to landowners the right of buying out this servitude, after 15 years, either by agreement or by ruling of the court. This right was also reserved to the State, the communes and public institutions. In fact, this servitude claim was not respected even by the State (1).

In spite of certain mistakes inevitable in a reform on so large a scale, the agrarian work accomplished by Couza remains a great achievement, and has the lasting gratitude of the Rumanian people.

In virtue of this law of 1864 peasants to a total of 467,840 were granted expropriated land on an area of 1,766,258 hectares. The distribution between the three groups of peasants previously indicated was as follows :

71,912	peasants owning 4 oxen	received	413,201	ha. 86
202,075	" " 2 " "	"	882,737	" 29
134,132	" " one cow "	"	384,708	" 20
59,721	" with dwelling house only	"	85,610	" 90
<hr/> 467,840			<hr/> 1,766,258 ha. 25	

As above stated, the law enacted that peasants who did not hold land on any landlord's estate should receive grants from the State lands. To give effect to this provision, different laws were passed successively in 1879, in 1881, in 1888 and in 1889 in virtue of which 86,325 peasants were in all settled on 881,695 hectares.

To sum up, from 1864 to 1889, the date of the last grant of expropriated land, the number of peasants receiving such land was 554,165 over an area of 2,647,953 hectares, that is to say, an average of 4.78 ha. per head of family.

The application of the law of 1864 resulted in a felt need for fresh legislation for establishing new relations between landowners and the newly freed peasants. The labour and letting agreements, concluded between them, needed to be regulated; once again it was the right of the stronger that prevailed under the plea that the work of the estate must be ensured. For instance, among other conditions imposed, each more onerous than the last, was one by which the peasant was liable to prosecution, in virtue of provisions under the special agrarian law of 1866, for the non-performance of work, while the landowner, if he fell short of his obligations could only be prosecuted under common law. According to the law of 1872 the peasant might be forcibly led to work, *manu militari*, at any time. It was only in 1882 that the peasant was placed by law on a footing of equality with the landowner in the eye of the law, and that the peasant was granted two days per week for his own work; but this law still kept him strictly bound by burdensome contracts.

As well as labour which had to be done for the landowner and the payment in cash of the rent, the peasant was still obliged to pay certain dues such as : a certain number of lambs, poultry, chinees of pork, smoked hams, eggs, etc. The law of 1893 abolished these dues but they remained for a long time in force although illegal.

In virtue of these laws, peasants who were without land or pasturage for their animals, found themselves obliged, in Moldavia, to enter into burdensome agreements in exchange for land or pasturage obtained, or for money advanced in the winter or during time of scarcity.

(1) IONESCU SISESTI. *Política agrara*, p. 79.

In Wallachia, where the peasant was in a less precarious position the system of produce-sharing predominated, that is to say, of division of the products with the landowner, the peasant however providing the labour, also of his animal and even the implements. Another system of labour in use was that of the *tithe per area* : by this system the peasant received a certain portion of land but was obliged in return to do also all the necessary work on another piece of the same size for the benefit of the landowner.

To sum up, the position of the peasant, as can be seen, was still lamentable ; the governments paid no attention to his requirements, he was left to the mercy of the first agent who came. The income of the estate was obtained rather from the exploitation of the peasant than from the working of the land.

The trusts formed by the agents are so well known that it is unnecessary to refer further to them.

The logical consequences of all that has been here described could not fail to be felt ; the melancholy events of 1907 were the direct results ; these happenings, which shook to their foundations the organisation of the State, resulted in a series of laws which although still incomplete opened avenues hitherto not known to the peasants of the old Kingdom.

In fact the law of Trusts, the Farm Agreements law, the law founding the Rural Bank, the law for Popular Banks, the judiciary law and the administrative law, are laws which gave a new direction to the agrarian problems which up to that time had never been solved except in the interest of one of the two classes.

The Farm Agreements Law in particular may be regarded as the first law which dealt effectively as much with the relations between the two classes as with the improvement of the crops of the peasants ; by it the peasant was obliged to cultivate at least 10 ares of forage crops per head of cattle, on pain of having his pasturage rights taken away.

As well as abolishing the tithe, this law abolished the penal clauses and those relating to liability which had been much abused, and it also forbade the employment of all measures which were not official.

A provision which at first seemed useful but had no practical outcome was that for forming common pasturages by purchase of a part of the lands of the owners, on an offer being made by one of them. The result was negligible and communal grazing grounds were formed much later by the application of the Agrarian reform.

The application of the Farm Agreements Law was entrusted to a new institution " the Higher Council of Agriculture ", with an agricultural inspector attached in each department. Thus for the first time the interests of the farming masses were closely watched.

B. — *Transylvania.*

In Transylvania, that Rumanian province which was reunited to the Kingdom by the Assembly of Alba-Julia on 1 December 1918, the position of the serfs led to repeated peasant risings in the course of past centuries.

According to Xenopol, a Rumanian historian, the first peasant revolt in Transylvania took place in 1290 in the district of Fagarani ; the second occurred in 1339, due to the excesses of those persons who were responsible for levying the tithe. In 1434 the Hungarians and the Rumanian *robagi*, or serfs, raised, with the help of the smaller nobles, an insurrection which embraced the whole of Transylvania.

The revolt of 1434 resulted in a pact by which new conditions of work were

established, and which for the first time gave the peasants the power of moving from one piece of land to another, on the condition only of paying the taxes. This pact had no practical result, and the outcome of the struggles of 1438, was that the peasants, in spite of the rights it conferred on them were once again completely subjugated.

The exercise of right of moving from one to another plot of land was hampered by so many difficulties that the serf preferred remain where he was, as "so long as he remained on the land the lord did not ask for rent and inflicted no punishments on him" (1).

But even this semblance of liberty was taken away by Mathias Korvin who, by art. 30 of his law of 1459 suspended avowedly for one year the right of the peasant to move from land to land. In fact this suspension was maintained up to 1468, when it was revoked.

In 1470 a new law empowered the landowners to replace on their lands by force those serfs who had moved away, and the authorities were compelled, under pain of severe punishment, to give assistance to the land owners, and the serfs were haled from one plot to another like animals (2).

Laws both for the relief and for the oppression of the serfs followed each other rapidly; thus the law of 1492 maintained in appearance the right of the serf to move but raised so many difficulties that it was, as Acsady says, merely a law for binding the serf to the soil (3). The serfs found themselves compelled to meet the expenses of the meetings of the General Assemblies over which the King presided, although the questions discussed concerned only the nobles.

It is easy to understand how these abuses wore out the patience of the serf-population and why in 1514 a new revolt broke out under the leadership of Dozsa Georges Sacuiul (4) a revolt which was one of the most sanguinary in history and which was put down, 70,000 serfs were killed and their leader put to death with torture.

In 1514 under the reign of Vladimir II, there was introduced the book of the laws of Verboczy, a book which according to the ancient chroniclers, should have been written in blood and in virtue of which the peasant had the right to nothing except the mere wage of his work, "rusticus praeter mercedem laboris sui, nihil habet" (5).

A series of other laws next dealt with the right of serfs to move to other land; the most draconian of these was of 1650 which gave the owner the right to bring back and place again on his land even the children of serfs, without distinction of age (6); the law went so far as to enact that the serf had no right to wear garments of fine cloth, boots or shirts of fine make, or headcoverings of a value above a florin, on pain of having his right hand cut off.

In 1714, after the suppression of the revolution of Racotzi, even harsher measures were taken against those serfs who had fought at his side, including a measure compelling the serf to give four days of forced labour per week. As it was not specified that these four days were to be given by the head of the family, the measure extended to all members of the family.

(1) ACSADY. *History of Serfdom in Hungary*, p. 150.

(2) MARKY S. *Aradmegye Története*, I, 397.

(3) ACSADY. *Op. cit.*, p. 168.

(4) The "Siculi" were the Hungarians who lived in the East of Transylvania.

(5) V. BALCESCU. *Romania sub Mihaivode Viteazul*, p. 226.

(6) G. BARITIU, *Op. cit.*, p. 115.

On 12 November 1769 Maria Theresa introduced a certain amelioration into the lot of the serfs by a law known under the name of "Certa puncta". It abolished *inter alia* the tax known as the "Penaticum" which consisted in a payment made by the serf to the lord for the use of pencils for transcribing his accounts. The "Certa puncta" obliged the lords to cede to the serfs plots of arable land, grasslands and pasturage, sites for dwellings, right of pasture, of gathering wood for fuel and for building, as well as the right of collecting acorns and beechnuts. The law also regulated the problem of succession, giving to the widow of the serf the right to a portion of the inheritance.

Joseph II observed the melancholy condition of the serfs while on a journey across the country and took measures which were intended to improve this situation. By the law of 16 August 1783, he granted to the serfs the right of buying and selling their holdings, of marrying without the consent of their lords, of learning different crafts and of moving wherever it seemed good to them. But these favourable measures were very soon repealed under pressure of the great lords, and on 28 January 1790 Joseph II, withdrew all rights previously granted by an edict, known as "revocatio ordinationum".

The position became more and more intolerable and the discontent of the peasants was displayed in every possible way. In 1817, the Emperor Francis, in the course of a journey of inspection, took note, as Joseph II had done, of the situation and on 17 May 1819, by Order No. 1677 he ordered the regulation of the relations between the peasants and the lords and instituted the "Urbarium", which consisted in detailed statistics of the holdings owned by the lords and by the serfs, the number and names of the serfs, particulars of all kinds of tithes and charges paid to the land owners, the areas of pasturelands and forests, etc. On this occasion there was abolished, without compensation, a whole series of dues and taxes which weighed on the serfs, while they were granted the right of selling their products where they thought fit, as well as other advantages.

In point of fact these advantages were all that really accrued to the serfs, for the all powerful lords hindered in every possible way the complete realisation of the Urbarium which did not come up for discussion till 1842 and till then remained in the Parliamentary files.

The following are the words in which Georges Baritiu (1) spoke of the situation of the serfs in Transylvania: "The third class, which is the most numerous, since it is the peasant class of the greater part of the country, was deprived, more especially after 1514 and without distinction of nationality or religion, of all civil and political rights, even of all persons rights: this class was unconditionally subject to the good pleasure of the landowner, just as an animal and that equally in practical life as by the law".

The results of the revolution of 1848 were felt also here, and the laws that were subsequently passed by the Diet of Transylvania abolished all the forced labour, the tithes and all kinds of taxes or dues paid previously by the peasants to the landowners. These latter were compensated by the State which levied for the purpose a proportional tax on all inhabitants. At the same time the former serfs were settled on the lands they were cultivating, their situation in this respect being more advantageous than that of the peasants in the Old Kingdom who received only, as has been already stated, two-thirds of the land.

In virtue of his law, 173,781 families of serfs gained freedom and the possession

(1) G. BARITIU. *Partie choisie de l'Histoire de Transylvanie*. 1st volume, p. 8.

of 1,615,574 arpents of land. The communal forests were constituted at this time, formed of all the parcels of forest that fell to the share of each peasant.

But the problem was not yet solved; although the serfs had obtained liberty and the possession of the lands they worked, the greater part of the lands still remained in the hands of the landowners, which gave rise to perpetual friction between the two classes.

Of the total number of persons owning land 87.6 per cent. held in full ownership 2,356,738 hectares distributed in plots of from less than one hectare to ten hectares, while 0.6 per cent. held 2,751,457 hectares in estates of more than one hundred hectares.

In this province the medium-sized holdings, *i. e.*, those from 10 to 100 hectares, constituted an area of 2,153,117 hectares belonging to 11.8 per cent. of the number of those owning land.

C. — *Bessarabia.*

The situation of the peasants of Bessarabia differed from that of the other provinces. Here the peasant was a free man; the Statute known as the Peasants' Statute of 1861 which gave rights to the peasant only benefited a small proportion of whom the greater number were farm servants on the estates of the landowners. Under this law, and subsequent laws, among which may be quoted those of 1858 1861, 1866 and 1886, a considerable part of the State lands and of the appanages passed into the hands of the peasants. None the less here as in the other provinces the distribution of land was extremely unsatisfactory. Out of the total number of persons owning land, 98.4 per cent. held in full ownership 2,156,827 hectares distributed in plots of from less than one hectare to ten hectares, while 1.6 per cent. held 1,844,539 hectares in estates of more than 100 hectares. Hence in this province also a revision of landowning conditions became necessary.

D. — *Bukovina.*

In Bukovina the situation was nearly the same as in the other provinces. The 12 days of forced labour which the peasant was obliged to give his lord in accordance with certain earlier laws, were raised to 100, and immediately after the annexation of this province to Austria in 1777 to 150 days.

The revolution of 1848 had an influence also on this province and by the law of 30 August of that year, the peasants became owners of the lands they cultivate, with compensation to the owners of the estates.

The distribution of the land was extremely unsatisfactory; more than half the rural population had one hectare or less, an area not sufficient to maintain a family. Hence a series of discontents arose as elsewhere.

CHAPTER II. — THE AGRARIAN REFORM.

An account has been given of the situation of the peasants of the Old Kingdom and of the annexed provinces up to the present day, as well as of the relations existing between them and the large landowners.

Although the laws passed in the Old Kingdom after the disastrous events of 1907 resulted in a certain improvement in the relations between the two classes, the position of the peasant was by no means enviable, simply from the fact of the inequitable disproportion that existed in the distribution of the lands. The result

of this distribution was that the majority of the peasants found themselves compelled, if their necessities were to be met, to hire out their labour and that of the members of their families on conditions that were very oppressive. Even for the more well to do peasants who owned some animals, but had no pasturage, the situation was the same: they had to enter into hiring agreements that were very oppressive in order to obtain pasturage for their stock. The dependence was complete: no work, no pasture; this position was the general one and although the law of 1907 had made provision for the creation of common grazing lands taken out of of the estates of the large landowners, this law was not made obligatory and consequently the number of communes that received grazing grounds was very limited.

Moreover the peasants, in the hope of obtaining better pasturage and in the belief that the law would compel the large landowners to give up land for this purpose parcelled out and brought under cultivation the grazing lands, they obtained in 1864. This increased their dependence on the large landowners, or more accurately, on the tenants of these.

As illustrating more clearly the dependent situation of the Roumanian peasant, it is enough to state that 0.64 per cent. or 5,385, out of the total number of persons owning land, held 3,810,351 hectares, representing 47.7 per cent. of the total area, while 99.36 per cent. or 968,622 persons, owned 4,180,648 hectares, representing 52.3 per cent. only of the total area (1). In addition the labour supplied by the peasant was remunerated at rates that were often absurdly low,

It will be understood that the precarious situation of the peasant class, that is to say of the fundamental, because the most numerous, class in the country, constituted a real hindrance to the progress not only of this class, but implicitly of the whole of Rumania. For this reason, some time before the war, all the attention of statesmen was directed towards the amelioration of the lot of the peasant, an end which could only be achieved by a wide measure of agrarian reform.

This idea began to take shape from 1913, and it was only the break-up of States and general confusion caused by the European war that prevented the agrarian reform from being accomplished at the time.

The agrarian reform, as conceived, violated the right of ownership, declared inviolable by art. 19 of the Rumanian Constitution; hence the first act of the Constituent Assembly which met at Jassy in 1917, while war was raging, was to modify that article, admitting the principle of expropriation for reasons of national utility.

The new Constitution fixed the classes of lands that should be expropriated and laid down that there should be complete expropriation of the cultivable lands belonging to the Crown, the Rural Bank (2), public or private bodies corporate, foundations, etc. This applied even in the cases where deeds of foundation of testamentary donation or any other provision of whatever kind had prescribed, whether directly or by some limiting clause, that these lands were inalienable, or incapable of being devoted to any other use. It defined also the other classes of lands which should be expropriated, and fixed at 2 million hectares the *quantum* which

(1) Dr. A. NAITO. La réforme agraire en Roumanie. Report submitted to the XIVth International Congress of Agriculture.

(2) Originating in a special law following on the revolts of 1907, with a capital of 10,000,000 lei half of which is subscribed by the State. The object was to purchase the large estates and divide them among the peasants. From 1909 to 1913, the Bank purchased only 100,000 hectares.

could be taken, from private owners in the country only, in accordance with a progressive scale.

All details were also made clear in respect of oil-bearing lands, communal grazing grounds, prices, etc.

On the same occasion art. 57 of the Constitution was modified, and the introduction of universal suffrage became possible.

Immediately after the signing of the armistice, King Ferdinand of Rumania in his proclamation of 12 November 1918 made use of the following words: "On the basis of the reforms — universal suffrage and agrarian reform — we shall secure social and economic life for all workers with a greater measure of justice and of advantage".

The landowners on their side gave their support to the accomplishment of this great social achievement initiated by King Ferdinand.

A review will now be made of the different agrarian laws on the basis of which hirst expropriation and then the assignment of the expropriated lands was carried out.

§ 1. The Expropriation.

A. Old Kingdom.

Decree-Law No. 3681. — In the Old Kingdom the Decree-Law No. 3,681 of 14 December 1918 enacted the first expropriation measure drawn up according to the provisions of the Constitution. This Decree was completed by the Decree-Law No. 3697 published on 15 December 1918.

In virtue of this Decree-law, a total area of 2 million hectares had to be expropriated, in addition to the State lands, Crown demesnes, and lands belonging to public or private bodies, to institutions, foundation as well as lands belonging to foreigners.

By this Decree two kinds of expropriation were contemplated: total and partial.

Total expropriation was prescribed for three groups of lands:

(a) the cultivable lands belonging to the Crown estate, the Rural Bank (1), and to all public or private bodies, to institutions, foundations, etc.: as had been contemplated by the Constitution;

(b) rural properties as a whole, belonging to foreigners, whether by origin, or having taken foreign nationality by marriage or in any other manner;

(c) rural estates belonging to absentee landlords.

Partial expropriations. — These apply only to cultivable lands, *i. e.* arable lands, pasturelands, grasslands and any land suitable for crops. By the provisions of the Constitution, the *quantum* of 2 million hectares was to be completed by partial expropriations combined with expropriation of the lands of absentees.

With the object of facilitating and especially of hastening the course of the formalities by which the land was to pass into the full possession of the peasants, the following progressive scale was provided and formed part of the Decree-Law:

It will be noted that this scale fixed at 100 hectares the share of the land owner which could not be touched, and at 500 hectares the maximum area that could be left to him. The result made it clear that if this provision resolved the problem from the social point of view by reducing the area of the latifundia, it was however uneconomic since all farms without distinction were cut up. In certain re-

Area of land		Share left to the landowner		Area of land		Share left to the landowner	
100 Ha.	100 Ha.	100 Ha.	100 Ha.	1,500 Ha.	1,500 Ha.	307.8 Ha.	307.8 Ha.
110 "	"	109 "	"	2,000 "	"	334.6 "	"
120 "	"	117.2 "	"	2,500 "	"	338.7 "	"
130 "	"	124.9 "	"	3,000 "	"	351.4 "	"
140 "	"	132 "	"	3,500 "	"	365.8 "	"
150 "	"	138.6 "	"	4,000 "	"	374.9 "	"
160 "	"	144.7 "	"	4,500 "	"	388.2 "	"
170 "	"	150.5 "	"	5,000 "	"	396.9 "	"
180 "	"	155.9 "	"	5,500 "	"	409.7 "	"
190 "	"	160.9 "	"	6,000 "	"	418.1 "	"
200 "	"	165.7 "	"	6,500 "	"	426.5 "	"
300 "	"	201.7 "	"	7,000 "	"	438.8 "	"
400 "	"	224.8 "	"	7,500 "	"	451.2 "	"
500 "	"	241.2 "	"	8,000 "	"	459.2 "	"
600 "	"	253.7 "	"	8,500 "	"	471.7 "	"
700 "	"	263.6 "	"	9,000 "	"	479.7 "	"
800 "	"	271.8 "	"	9,500 "	"	491.9 "	"
900 "	"	278.8 "	"	10,000 "	"	500 "	"
1,000 "	"	284.9 "	above	10,000 "	"	500 "	"

gions so many lands were expropriated that the local requirements were exceeded while in others the contrary was the case. Hence it was that the agrarian law of 1921, which was economic in character, was passed to supplement the Decree-Law.

In virtue of the Decree-Law the expropriated land was placed directly at the disposal of the peasants constituted into *obstii*, or peasant associations which included all the peasant cultivators who were either landless, or had less than five hectares, had taken part in the war of 1916, were less than 50 years old, and had not been convicted of any offence. Lists of these entitled to land were drawn up in village by the agricultural authorities.

At the head of the lists were placed, as was proper, ex-service men, and the widows and orphans of the war.

The *obstii* were organised, directed and supervised by a special body, the Central Bank of Co-operation and Settlement of Peasants on Expropriated Lands, which had its headquarters in Bucarest. The function of this body was to give effect and application to the Agrarian Reform in its entirety.

Although mistakes have undoubtedly been made, the *obstii* have played an important part and mark an epoch in the agriculture of Rumanian peasants: their educational influence was great, and the results would have been more valuable if it had not been for their premature suppression.

Provisions were also included in the Decree-Law dealing with payment for expropriated lands and the rent that had to be paid by the peasants until the expropriation was complete.

The price of the expropriated land was to be fixed by the Expropriation Commissions: persons who were regarded as lessees by the judgments of these commissions had the right of appeal to the corresponding Court of Appeal. For price fixing, the type of land, the rent and the market price in the region had to be taken into account, and these points had to be ascertained by a visit to the locality of the Commissions and agricultural authorities.

The value of the expropriated land had to be paid to the landowner in virtue

of art. 46. of the Decree-Law by means of bonds redeemable in fifty years by annuity charges of 5 per cent.

Corporate bodies were paid by a perpetual annuity at the same rate.

The rent was to be paid through the *obstii* which was to collect the shares of each peasant, and pay the total sums to the State which undertook the payment of the rent due to the landowner.

In the Decree-Law a number of questions of detail are also treated.

With a view to assisting the peasant the State took on its own account 35 per cent. of the expropriation price and one-third of annual payments for grazing lands if the landowner renounced the claim to the subsoil.

In order to avoid fraudulent action, in judging of the extent of the property for purposes of expropriation, the legal position was taken as that on 15 August 1916, the date on which Rumania entered the war.

The executive body was the local Commission consisting of the magistrate, as Chairman, a representative of the landowners and one of the peasants. Appeal could be made on the findings of this Commission to the Departmental Commission, the chairman of which was the local magistrate or a magistrate of the Court appointed by the President of the Court, with two representatives of landowners, two of the peasants and a delegate appointed by the Government.

Appeal could be made, if desired, against the decisions of this latter Commission to the regional Commission, which was active in every district of the Court of Appeal; the chairman in this case was either the President of the Court of Appeal or the President of the local Court, and the Commission included a delegate of the Higher Council of Agriculture, a delegate of the Government, a representative of the landowners and one of the Federation of peasant co-operative societies.

Agrarian Law of 1921. — It has already been noted that the provisions of the Decree-Law in regard to the progressive scale were uneconomic; this defect was corrected by the law of 1921, which established the maximum that could be left to the landowner with due consideration of the number of persons entitled to land in each region.

It followed the Decree Law in prescribing two kinds of expropriations, total and partial.

Total expropriations. — The following were subject to total expropriation:

(a) estates which had been let for a period of 10 years between 23 April 1910 and 24 April 1920 inclusive, with the exception of such lands as had been let, with a proper deed or even merely for a fixed period, by parents, guardians of minors and of interned persons, lands legally sequestrated, lands belonging to the wives of public officials or army officers;

(b) the cultivable lands of the Crown estates, or belonging to the Rural Bank or any public body, institution, foundation, donation, bequest, etc., even in the cases where the foundation deeds either directly or indirectly prescribed their non-alienation. Exception was made of the grazing lands of urban and rural communes as well as of those belonging to churches and schools, in the two latter cases up to 12 hectares only;

(c) lands belonging to foreigners or absentees;

(d) land utilised under the form of emphyteusis, hereditary lease or under similar form, is expropriated for the benefit of the holders in emphyteusis, whether situated in urban or rural communes, and whether or not occupied by plantations or buildings;

(e) rural property belonging to persons under sentence for offences against

the safety of the State or for desertion, and even if for other offences of less serious nature.

In addition, art. 7 of this law abolished all rights and privileges of every kind and of any origin which the landowners may have been able to exercise on their lands.

Partial expropriations. — As from the beginning the principle adopted was that legislation should deal also with the economic aspect, a special protection was contemplated of farmers working their own land. Hence after complete expropriation being applied to those who had let their land over a period of ten years, an area of 100 hectares of cultivable land was fixed as the minimum share which could not be touched for estates that were let on 23 April 1920 or at the date of the application of the law.

For the fixation of the share which could not be touched in the case of other lands, the first consideration was the region, and the next the number of persons entitled to land, also the method of farming the estate scientific or not, and the value of the investments made. Hence from private estates worked by the owners themselves, there was expropriated under art. 8 all arable land in excess of :

- 100 hectares in hilly and mountainous districts,
- 150 hectares on the plain where the requirements were large,
- 200 hectares on the plain where the requirements were medium,
- 250 hectares on the plain where the requirements were already met.

The part which could not be touched was raised in the case of those estates which on 1 February 1921 had large investments in buildings, stock farming plant, installations for agricultural industries, or which were farmed by the owners themselves, to :

- 100 hectares of arable land in hilly or mountainous districts,
- 200 hectares of arable land on the plain where requirements were large,
- 300 hectares of arable land on the plain where requirements were medium,
- 500 hectares of arable plain land where requirements were already met.

Under the same class were included landowners who had farm investments on 15 August 1916 (the date of the entry of Rumania into the war), or whose land was situated in the regions devastated by the war.

With the object already stated, in the case where one or more sons of the landowner were students of agricultural science, 50 hectares were assigned by the law to each of the sons in the plain regions ; while landowners who were themselves qualified agronomes enjoyed the same rights.

There were excepted from expropriation areas planted in vines, orchards, or any plantation in existence on 1 July 1917, lands artificially irrigated, forests, streams, pools, lakes, lands occupied by buildings, farmyards, as well as unproductive lands.

The subsoil of expropriated lands remains the property of the State with the exception of the subsoil of lands expropriated for the formation of grazing lands in mountain and hill districts which remains the property of the expropriated owner.

In view of the existence of owners possessing lands in one or more departments, and with the object of centralising and facilitating the working of the parcels remaining in the hands of the same owner, the principle is introduced into the law of co-ordination in virtue of which landowners, possessing several estates exceeding 500 hectares cultivable, underwent expropriation up to :

200 hectares if the lands had been leased on 23 April 1920 or at the time of the application of the law,

- 200 hectares in the hill or mountain districts in all regions,

250 hectares in regions where the requirements were large,
400 hectares in regions where the requirements were medium,
500 hectares in regions where the requirements were already met.

The Law gave advantages to owners who, on 1 February 1921, had on their lands well organised stock farms, agricultural plants with their own inventory or agricultural industries. It was stipulated that in such cases a maximum of 500 hectares must be left to the owner.

In view of communal grazing lands, it was provided by the law that the expropriation should be carried out so as to reduce the share left to the owner in mountain regions, where the lands are suitable for pasturage, etc., as low as 25 hectares. Forests also could be expropriated for the same purpose, but only after consulting the Technical Council of the Forests' Fund and with the approval of the Agricultural Committee.

A sufficient area was left to stockbreeders even if it was necessary to exceed the share fixed by art. 8.

It will thus be clear that all measures were taken to prevent interference with the proper course of agriculture.

The area to be expropriated was calculated on the extent cultivable, after having left out of consideration the non-expropriable areas of the land, *i. e.*, the vines, the plantations of every kind in existence on 1 January 1917, artificially irrigated lands, forests, waters, swamps, pools, lakes, large fish ponds as well as areas taken up by farmyards, buildings, parks, roads, ravines, etc.

By cultivable lands are meant in the law arable lands, lands used as grasslands and grazing grounds including flooded lands which are capable of being cultivated or used as pasture for animals.

Estates in joint possession were regarded as divided from the point of view of the portion subjected to expropriation, with some exceptions.

A whole series of other detailed measures regulated the different questions relating to sown areas, exchanges, sales, leases, etc.

As regards the share that should be left to the owner, the law stipulated that all possible means should be taken to ensure that this share formed a whole so as to facilitate the economic farming thereof.

So as to prevent any evasion of the agrarian reform the law prescribed that the State should have the right of the pre-emption, with equal prices and conditions, in the cases of sale alike of expropriated lots and of lands of more than 50 hectares. With the same object the legal position of the expropriable lands is considered as that on the 15 August 1916, taking into account the effect of any inheritances that have occurred from that date up to 1 February 1921. Exception is made of sales effected up to 1 February 1921 to associations of peasants, to Popular Banks and to cultivators, but only up to 10 hectares a head. Similarly for sales for the formation of industrial establishments.

The law made provision for the following executive organisations :

1. *District Expropriation Commissions*, one in each administrative area. The duties of these Commissions were to pronounce in the first instance on the legal position of the estates from the point of view of expropriation, and to collect the necessary data for the valuation of the arable lands, the forests, etc.

Every District Commission consists of the local magistrate as chairman, a delegate of the Central Bank of Land Settlement, a delegate of the owners and a delegate of the peasants ;

2. *The Departmental Expropriation Commissions*, one in each department.

These Commissions pronounce in the first instance on the appeals made against the decisions of the District Committee.

The constitution of these Commissions is as follows :

(a) a Councillor of the Court of Appeal appointed by the Ministry of Justice as chairman, or in absence, the president of the local tribunal or one of the judges of the court appointed by the president ;

(b) a delegate of the Central Bank of Land Settlement ;

(c) a delegate of the landowners ;

(d) a delegate of the peasants.

3. The *Agrarian Committee*, with headquarters at Bucarest, composed of high magistrates of the Court of Arbitration and of persons expert in economic matters. The Agrarian Committee constituted the advisory body of the Minister and gave pronouncements on the cases in which the law had been misinterpreted.

As regards the price of expropriated land, the law enacts that it shall be fixed taking as basis the rent fixed by the regional Commissions, during the period 1917 to 1922, and multiplying the price by 40 for cultivable land and by 20 for pasture-lands.

The price is fixed for each estate, each class and each quality of land. The collection of data is undertaken by the District Commissions for Expropriation who forward them to the Departmental Commissions which fix the price in the first instance with right of appeal to the Court of Appeal.

The decision of the Court of Appeal are subject to recourse to the Court of Cassation in the event of the law being violated ; this step can only be taken by the Ministry of Agriculture, through the intermediary of the Procurator General.

The payment due to the landowner for the expropriated land is made on the basis of the decisions in respect of expropriation and price fixing, in two instalments : 80 per cent. of the value immediately, the remaining 20 per cent. as soon as the surveying operations have been finally effected.

B. *Transylvania.*

The Assembly of Alba-Julia in its meeting of 18 November, at the same time as it decreed the union of Transylvania with the Kingdom, resolved on the application of a series of reforms, among which the principal ones were universal suffrage and the Agrarian Reform.

The following is a quotation from the proclamation of the Administrative Council (1) of 29 November 1918 published in the first number of the *Official Gazette*. It refers to the necessity for agrarian reform :

"The soil, which for centuries past has been worked by the peasants in the sweat of their brows is now passing into their possession in that measure that their zeal in work merits. The object is alike to content them and to ensure the increase of the production of our land by the labour of all. Those nations only which arrive at the maximum of production, which produce to the fullest extent, have the right to their place in the great family of nations " (2).

With the object of ensuring production the first step accomplished was the leasing of the State lands, the lands belonging to corporate bodies and private persons who were without a proper inventory and gave no guarantee of a good yield. The State model farms were excepted from this measure.

(1) Provisional Government of Transylvania immediately after the Union.

(2) *Official Gazette*, No. 1 Sibiu, 1 December 1918.

At the same time the bases of an agricultural organization were definitely laid, and the Decree-Law of 10 September 1919 approved the scheme of agrarian reform as drafted and proposed by the Great National Council of Transylvania.

The objects of the Decree Law which formed the basis of the expropriation as carried out in the Transcarpathian provinces were as follows :

1. to increase and to convert into economic units the peasant holdings ;
2. to encourage intensification of rural economy, by the preservation or creation of medium sized holdings and model farms ;
3. to facilitate the development of the national industry and to reserve for that purpose all necessary lands ;
4. to improve living conditions for the inhabitants of towns and of mining and manufacturing centres and of watering places, by reserving lands suitable for the formation of workers' allotments etc.

The Decree prescribed for certain cases complete expropriation of an imperative kind and for other cases the possibility of complete expropriation.

Organs of Application. — The Higher Administration of the work of the agrarian reform was then entrusted, by art. 13 of the Decree Law, to the Higher Council for Agrarian Reform which consisted of two presidents, 12 full members and 24 proxy members and the necessary staff.

As subordinate bodies there are :

(a) The Local Commission, consisting of the magistrate, the agricultural Councillor, or his deputy, the landowner or his lawyer and two representatives appointed by the peasants.

(b) The Departmental Commission consisting of a magistrate appointed by the President of the Tribunal from among those eligible, two delegates of the Prefect, the Agricultural Advisor or a delegate of the Department of Agriculture, a delegate of the Agricultural Bank (1), a land surveyor, a forestry engineer and any other expert who may be necessary.

The duties of the local Commissions were, according to the art. 16 of the Decree-Law, to endeavour by means of an amicable arrangement between the landowner and the peasant to facilitate definitive expropriation, both in respect of the area to be expropriated and the price to be paid.

The Departmental Commissions had, when the parties were agreed, to mark out on the land the area expropriated, to fix the boundaries, and then the price, taking into account the quality of the land and the other circumstances.

In the event of the local Committee not having been able to effect an arrangement between the parties, the Departmental Commission was then to decide upon the area for expropriation and the price to be paid.

The decisions of the Departmental Commission, as regards expropriation, were subject to an appeal to the Higher Council for Agrarian Reform, and as regards price, to the Court of Appeal of Cluj.

Art. 33 of the Decree-Law established the order in which the assignment of land to persons entitled might be effected, as well as a series of other details in regard to the fixing of prices of expropriated lands, the method of farming these lands up to the time of assignment by means of temporary leases to persons entitled etc.

A series of orders were issued by the Council establishing the rules in accordance with which the land might be rented up to the final assignment of the land.

(1) Established with the object of effecting all the financial operations in respect to the agrarian reform. Later by art. 137 of the law these operations passed to the account of the State.

A table is given below of the lands leased during three years (1919-1920-1921) up to the time of the application of the law.

As has been stated that the Decree-Law left it to the Commissions to establish an understanding between landowners and peasants. It was soon clear that this system gave rise to many abuses at the time when, in the period preliminary to expropriation, the expropriable lands were to be granted on lease to peasants. This unsatisfactory state of affairs was remedied by the law of 1921, which followed the same general lines as that of the Old Kingdom, with very small distinctions due simply to local circumstances.

For example, the unit of area in Transylvania being the *jugar* (5,755 square metres) this measure was adopted also by the law, the reason given by the legislator, M. Garoflid, former Minister, being that it was essential to take fully into account favourable local conditions, such as the geographical position, density of the population, the numerous outlets and means of communication, all points favouring a more effective cultivation of the land in Transylvania, and that, in this sense and from the agricultural point of view, this unit of area was equivalent to the hectare of the Old Kingdom (1).

Another distinction is that in Transylvania a distinction exists between the public corporate bodies, such as the Communes, the foundations, the schools, hospitals, etc. the rural lands of which are subject by law to total expropriation, and private societies, such as Banks, vocational unions and the like, in the case of which the cultivable land alone is expropriated.

Again whereas in the Old Kingdom the law expropriated all land belonging to foreigners, in Transylvania as the whole population is regarded as being Rumanian, all persons were treated as Rumanian citizens.

As in the Old Kingdom, so in Transylvania, the lands of absentees were expropriated in full; but whereas in the Old Kingdom landowners who had been absent from Rumania during the previous five years were treated as absentees, in Transylvania there were considered as absentees those who had been out of the country, apart from an official mission, between 1 December 1918 (date of the meeting of the Assembly of Alba Parliament) and 23 March 1921 (date of the submission of the law to Parliament), and only those whose property exceeded 50 arpents were regarded as coming within this category.

As regards lands which have been rented for more than 10 years, everything in excess of 30 arpents in rural communes and 10 arpents in urban communes is expropriated; for lands which were found to be leased on 1 May 1921 expropriation extended to all over 50 arpents in the mountains and hills and over 100 arpents in the plain.

Minors were excepted from this last class as not being responsible for the letting of their lands. Lands rented in accordance with the provisions of the Council of Management were also exempt.

For the large mass of private estates the system of the Old Kingdom was adopted, that is to say that due consideration was given to the region and to the number of persons entitled to land and there was taken all land in excess of:

- 50 arpents in the mountain regions,
- 100 arpents in the hill regions,
- 200 arpents in the plain regions with large requirements,
- 300 arpents in the plain regions with medium requirements,

Table of areas rented during the years 1919, 1920 and 1921.

No.	Names of Departments	1919					1920					1921				
		Areas rented in accordance with the Order No. 82/919 of the Managing Council Arpentis					in accordance with Orders No. 7/153 and 20,293/920 of the Managing Council Arpentis					in accordance with the resolutions No. 5,617 and 30,313/921 of the Agrarian Committee Arpentis				
		Arable land	Mead-ows	Pas-tures	Forest pastures	Total	Arable land	Mead-ows	Pas-tures	Forest pastures	Total	Arable land	Mead-ows	Pas-tures	Forest pastures	Total
1	Alba Inferiorea	—	—	—	—	—	23 581	7 025	10 064	—	40 700	31 575	97 19	12 525	—	53 379
2	Arad	—	—	—	—	—	33 009	1 768	4 869	670	40 316	97 906	3 409	21 421	2 330	126 156
3	Bihar	16 785	10	3 835	—	20 630	20 750	10	8 214	—	28 974	47 626	2 546	19 168	14 826	84 266
4	Bistrita	114	155	3 084	—	3 353	828	1 446	8 990	—	10 664	2 506	1 444	3 738	8 283	15 971
5	Brasov	300	150	250	—	700	2 500	730	1 000	—	4 330	4 149	1 573	1 153	1 357	8 232
6	Cojocna	8 320	992	7 890	766	17 968	13 743	11 367	36 883	45 234	107 007	40 504	15 768	39 882	46 112	142 176
7	Cluc	850	1 420	—	9 750	12 020	2 850	3 500	—	18 000	24 350	4 300	10 000	—	50 000	64 300
8	Caras-Severin	1 282	373	1 222	—	2 877	26 865	7 742	6 293	24 900	65 890	46 520	4 816	—	30 870	82 206
9	Fegaras	120	116	250	—	486	155	135	292	—	582	3 134	3 136	2 807	—	9 077
10	Hunedoara	1 364	120	304	—	2 288	6 725	1 221	3 120	114 756	156 822	15 715	622	3 195	163 632	173 164
11	Maramures	264	1 800	2 000	—	4 664	1 591	6 342	2 301	—	10 234	1 620	6 375	2 301	—	10 305
12	Mures Turda	3 000	36	700	—	3 736	30 000	453	1 000	—	31 453	50 000	1 000	—	12 507	63 507
13	Jamnava Marc	679	334	320	2 496	3 829	4 036	2 293	2 150	7 421	15 890	3 610	2 910	2 725	10 462	19 707
14	Odorheiu	310	60	318	688	1 376	461	668	1 400	2 250	4 796	1 266	813	79	2 687	4 845
15	Satu Marc	—	—	—	—	—	29 323	3 261	22 013	3 083	67 710	41 251	5 391	28 470	10 964	85 780
16	Sibiu	670	936	2 000	—	3 606	1 402	1 373	8 337	—	11 113	2 134	1 792	7 630	—	115 556
17	Solnoc Doboka	11 697	2 104	12 397	—	26 198	18 119	2 251	27 338	—	47 708	37 765	1 596	26 500	—	65 780
18	Tarnava Mică	16 480	6 120	13 514	—	36 114	11 374	2 464	10 027	—	23 865	10 647	2 796	9 912	—	23 355
19	Trei Seane	415	—	150	890	1 455	1 250	—	500	2 000	3 750	4 731	178	2 185	5 436	12 530
20	Timis Torontal	—	—	—	—	—	42 216	6 119	2 131	—	50 466	7 15 936	5 355	20 961	—	152 252
21	Turda Arica	3 100	1 661	3 388	—	8 209	16 233	4 067	11 171	419	31 800	63 507	5 120	15 300	15 780	109 687
22	Salaj	850	350	1 000	—	2 200	6 031	725	21 982	25 667	54 425	14 030	2 054	32 630	20 630	98 650
Total		67 736	17 576	54 234	14 590	154 136	278 939	60 048	160 821	271 058	770 861	609 280	82 052	223 527	385 982	1 304 201

500 arpents in the plain regions where requirements had already been met.

In the regions where the requirements were large, the above shares might be reduced to 10 arpents, but only for lands which were not in the occupation of the real owners or their relatives, or on which agriculture was not being carried on.

The legal situation of the estates from the point of view of expropriation was taken into consideration as at the date of 1 December 1918.

Estates in joint ownership were expropriated up to the limit of 50 arpents for each owner. Share tenants established after the date of 1 January 1885 were expropriated in accordance with the rules of the region.

Measures were also taken for regulating the expropriation with the object of forming communal grazing grounds. For the development of existing communal forests and for the formation of new communal forests, the law prescribes the expropriation of forests in accordance with the proportions and conditions specially established, with the proviso that expropriation of forests cannot take place without previous consultation of the Forest Bank.

Under the law the lands of churches and monasteries were also expropriated, a share being left in each case for maintenance.

The question of housing was not forgotten and was dealt with by this law which with this object made provision for the expropriation of lands over a radius of 600 metres for rural communes and 1000 metres for urban communes.

In order to put a stop to any evasion of expropriation it was enacted that the State had the right of preemption in the case of sale of all land in excess of 50 arpents.

The price is fixed by the Departmental Commission and the Court of Appeal and is based on the data collected and submitted by the District Committee. These data include the selling price customary in the locality and neighbourhood, rents, the different estimates made previously but in no case exceeding the selling price before 1913.

The executive organs of the law were absolutely the same as in the Old Kingdom.

C. Bessarabia.

By the Act of 9 April 1918 the return of Bessarabia to the mother-country was decided in virtue of the right of self-determination and by the will of the people. The following is the declaration of the Union.

"In the name of the people of Bessarabia, the *Sfatul Tzareî* or the Council of the Country declares :

"The Moldavian Democratic Republic (Bessarabia) within the boundaries formed by the Pruth, the Dniester, the Danube, the Black Sea and the former Austrian frontier, detached by Russia for more than one hundred years from the ancient stock of Moldavia ;

"In virtue of historic right and of the right of nations ;

"basing itself on this principle that the people have the sole right of disposing of themselves henceforth and for ever,

"unites itself to the mother-country, Rumania " (1).

In this province, the agrarian reform was voted for the first time in 1918 by the *Sfatul Tzareî*. This law was ratified after annexation by the Decree-Law

(1) KIRITESCU C. C.: La Roumanie dans la guerre mondiale, p. 70.

No. 3791 of 22 December 1918, then voted in 1920 by the Parliament of Greater Rumania.

In Bessarabia as in the other provinces the law made provision for total or partial expropriations. Total expropriation was prescribed in the cases of: the owners of urban or rural landed property, including the State, the Crown, the Rural Bank and the other land banks and the monasteries; then the rural property of foreigners, the *zemstvos*, towns, communes and corporate bodies. As in Transylvania a portion was left to the monasteries and churches for their maintenance. Subject also to total expropriation were forests, except the peasant forest holdings, waters, lakes, pools and marshes.

Partial expropriation was prescribed in the case of private properties, but the share of cultivable land by the law was 100 hectares, whatever their extent, except vines, orchards, nursery and other plantations, which were not subjected to expropriation.

On properties which had been leased during a period of five years, between 1905 and 1916, 25 hectares only was left under the law to the owners.

The executive bodies were:

1. the Departmental Commissions, consisting of a magistrate as chairman, a delegate of the landowners, five delegates of the peasants and a representative of the State;

2. the Central Commission which pronounced in the last instance on the expropriation consisted of the first President of the Court of Appeal of Kisinou — capital of Bessarabia — as president, two delegates of the peasants, one of the landowners and one delegate of the "Casa Noastra", which was a self-governing institution and a corporate body, specially established for the application of the agrarian reform in Bessarabia and subject to the authority of the Ministry of Agriculture.

The price of expropriated lands was fixed in accordance with pre-war prices. The payment for expropriated lands is effected by means of instalments over a period of 40 years; the State does not contribute to the payment for expropriated lands.

D. Bukovina.

The expropriation law was passed for this province at the same time as that for the Old Kingdom and Transylvania.

Here also the expropriations were both total and partial. Total expropriation was prescribed for the rural property of public corporate bodies, with certain exceptions, corporate bodies of a private character, property of absentees and prescribed persons as well as lands that had been let for more than nine years between 1 January 1905 and 1 January 1919. In this last case there were excepted under the law the property of minors, of women, of public officials, and of all land held in trust.

For partial expropriations, the following classes were recognised:

- (a) all land in excess of 12 hectares belonging to churches and all in excess of six hectares belonging to church officers, sacristans, etc. was expropriated;

- (b) cultivable lands of the private estates possessing on 1 August 1914 any considerable farming plant — buildings and farm dead stock — studs, agricultural industries, were expropriated in accordance with the scale shown below, but in no case could an area of more than 250 hectares remain to the owner, however large the extent of the land;

(c) estates which on 1 August 1916 did not possess the farming plant indicated under letter (b) were expropriated up to the limit of 100 hectares of cultivable land.

Area of the land	Share left to owner	Area of the land	Share left to owner
100 ha.	100 ha.	230 ha.	178 ha.
105 "	104 "	240 "	182 "
150 "	109 "	250 "	185 "
115 "	113 "	260 "	189 "
120 "	117 "	270 "	192 "
125 "	121 "	280 "	195 "
130 "	124 "	290 "	198 "
135 "	128 "	300 "	201 "
140 "	132 "	320 "	207 "
145 "	135 "	340 "	212 "
150 "	138 "	360 "	216 "
155 "	141 "	380 "	220 "
160 "	144 "	400 "	224 "
165 "	147 "	420 "	228 "
170 "	150 "	440 "	232 "
175 "	153 "	460 "	235 "
180 "	155 "	480 "	238 "
185 "	158 "	500 "	241 "
190 "	160 "	525 "	244 "
195 "	163 "	550 "	247 "
200 "	165 "	575 "	249 "
210 "	170 "	600 "	250 "
220 "	174 "	over 600 ha.	250 "

As in the other provinces 50 hectares per head was left by the law to owners having sons who were agronomes.

In order to form communal grazing grounds, portions of forests were expropriated, if suitable for the purpose, also clearings of an area exceeding ten hectares.

The price was fixed according to the selling price ruling during the period from 1 August 1905 to 1 August 1914.

The executive organisations were the District Commissions, the Regional Commission and the Agrarian Committee constituted in the same way as in the other provinces.

§ 2. — Assignment of Land.

Once the land was expropriated, the first concern of the State was to hand it over as quickly as possible to the peasant, first under the form of temporary lease, then under a definitive title.

In the first place the law decided who were the peasants entitled to land and the order in which these claims should be satisfied. It should be explained that one of the most important considerations in the application of this reform, was the formation of the lists of persons entitled to land, such lists forming the basis for the work of assignment.

In order to ensure the preparation of these lists, a new organisation was set up

by law, namely, the local Committee, consisting of the mayor, the parish priest, the schoolmaster and four peasants, elected by the peasants, themselves. The lists were prepared by committees of this type in all the provinces, excepting Bessarabia where the lists were drawn up by the Departmental Commission.

As soon as these lists were established, they were checked and finally approved by the District Commission for the Assignment of Land. This Commission was composed, in the Former Kingdom, of the magistrate as chairman, the head of the agricultural region, the subprefect, two delegates of the peasants and a delegate of the Ministry of War, who checked the information in respect to the military status of the persons entitled to land.

The tables thus drawn up were then revised by the Agrarian Committee. Desertors were deprived of all claim to have land assigned to them.

In Transylvania, in addition to the local Committee, the District Commission for the Assignment of Land was also active. This Commission was identical with that for expropriation, and it pronounced on the lists drawn up by the first Commission and established the order of preference. The procedure differed from that followed in the Old Kingdom, in that the lists were subsequently checked by the Departmental Commission for the Assignment of Land, composed of the same members as that for expropriation, their pronouncement being final.

In Bukovina the lists drawn up by the District Commissions were checked by the Departmental Commissions and by the regional Commissions, consisting of the same members as that for expropriation.

In Bessarabia the organisations were the same as for expropriation.

Once the lists were definitely established, the standard lots were fixed as follows:

In the Old Kingdom by the Central Bank for the Assignment of Land at from 0.5 to 5 hectares;

In Transylvania, by the Departmental Commissions for the Assignment of Land at from 1 to 7 arpents;

In Bessarabia, by the Central Commission, at from 1 to 6 hectares;

In Bukovina, by the Regional Commission, at from 0.25 to two and a half hectares.

Supplementary lots were fixed for persons already possessing land, the extent varying according to circumstances.

In addition, land settlement lots were fixed, varying according to the region and quality of the land, but always larger than the standard lot.

The requirements were thus met in accordance with the sense of the respective laws. The same principles were applied in all the provinces, except for some differences due to local circumstances; the first requirements to be met were those of disabled men, widows and orphans of the war, then those of the men demobilised after the war; in the Old Kingdom land was assigned to the parish priests and the schoolmasters of the rural districts, as well as to the landless cultivators or those owning less than five hectares.

The assignment of land became an accomplished fact in virtue of the prepared lists and the standard lots fixed.

* * *

All the agrarian laws of course included a series of provisions relating to the economic organisation of the new peasant property.

Thus with a view to making possible a natural selection tending to the forma

tion of a new rural middleclass, constituting a solid foundation for the State, the agrarian law authorises the sale of lots, five years after entering into possession, except in Bessarabia where sale was only permitted at the time of discharge of the land in respect of the State.

Authorisation of sale is allowed with the restriction that a single person can only purchase up to 25 hectares. This provision was maintained by the law of 1929 on the circulation of property.

In virtue of this law all the lots acquired under the different laws relating to the assignment of land and paid for may be sold to land workers, including under this designation priests, school teachers, living in the country, as well as persons holding diplomas from schools of agriculture.

By another far-sighted social measure the subdivision of the land was prevented. With this object the law decided for the Old Kingdom and for Bukovina, that the lots could not be divided below a hectare for mountain and hill districts, nor below two hectares in the plain; for Transylvania not below two arpents. In Bessarabia no measure was taken in this sense.

In view of the fact that the new landowner stood in need of a new and more thorough training in agriculture, the law dealt also with this problem and provided even for dispossession in the case of those persons who did not conform to the lines laid down by the State organisations.

Payment of lands of landowners has been made directly by the State by means of a perpetual annuity for corporate bodies, and an annuity of 5 % payable for 50 years in the case of private persons. Peasants pay directly to the State 50 per cent. of the debt, the rest is covered by the State, the object being to make it easy for peasants to make the first purchases of the necessary farm stock.

§ 3.— Application of the Agrarian Reform to the Land.

For the full realisation of this vast scheme the State was required not only to make large advances, but also to supply an adequate technical staff for the land surveying, the fixing of the share to be expropriated of the land and for the parcelling. This work in view of its capital importance, even with adequate funds and a well trained staff needed time. Hence as the intention of the State was to place the peasant in immediate possession of the land, the State in pursuance of definitive decisions took over to its own account the lands which could be expropriated from its owners, and rented them temporarily to the peasants while awaiting the final operations, which are now for the most part effected.

The transfer of the land on these terms to the peasants was carried out by the departmental agricultural organisations, on the basis of the fixed standard lot and of the list of persons entitled to land.

The application *de facto* of the agrarian reform can only be considered as definitive from the moment that each peasant has individually received his plot, surveyed and with the boundaries marked under the instructions of the Land Survey Office, which is responsible under the law for the definitive carrying into effect and for the application on the spot of the expropriation and the assignment of lands.

In virtue of decisions which remain definitive, the Land Survey Department through its officials proceeded to the surveying of each land in turn taking care first to fill in the forms required for the establishment of the right of ownership. Once the survey was finished, the next step was the determination on the land of the portion expropriated fixing at the same time its boundaries both with respect to the part not expropriated and to the adjoining plot.

In order to avoid all possible errors, the law made provision for the right of challenging the surveying operations and any objections were heard in the last instance by the Departmental Commission and revised, if there is occasion, by the Agrarian Committee.

In virtue of the final decisions as to the surveying operations, the organs of the agricultural services and of the Land Survey Department, in the presence of a delegation of peasants, proceeded on the spot to the preparation of the plan of parcelling.

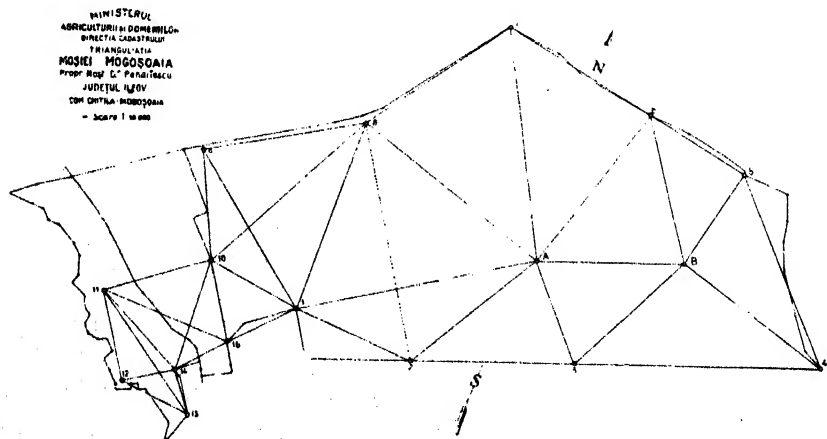
This plan first established the requirements of a general kind of the Commune and the State, *e. g.*, the lands required for schools, churches, creches, hospitals, orphanages, communal grazing grounds, stock watering places, for formation or enlargement of villages; it then fixed the number of plots and their lay out, the roads leading to them, and to the stock watering places, etc.

Taking this parcelling plan as a basis, the officers of the Land Survey drew up and then applied the plan of parcelling for each area separately, including sites for villages; in some cases to be built and in others merely enlarged.

As it was essential that the exact survey of each area taken separately should precede any other necessary work, it may be presumed that the agrarian reform was a work of considerable difficulty and this explains the fact that although much has been accomplished, the work is not yet completed.

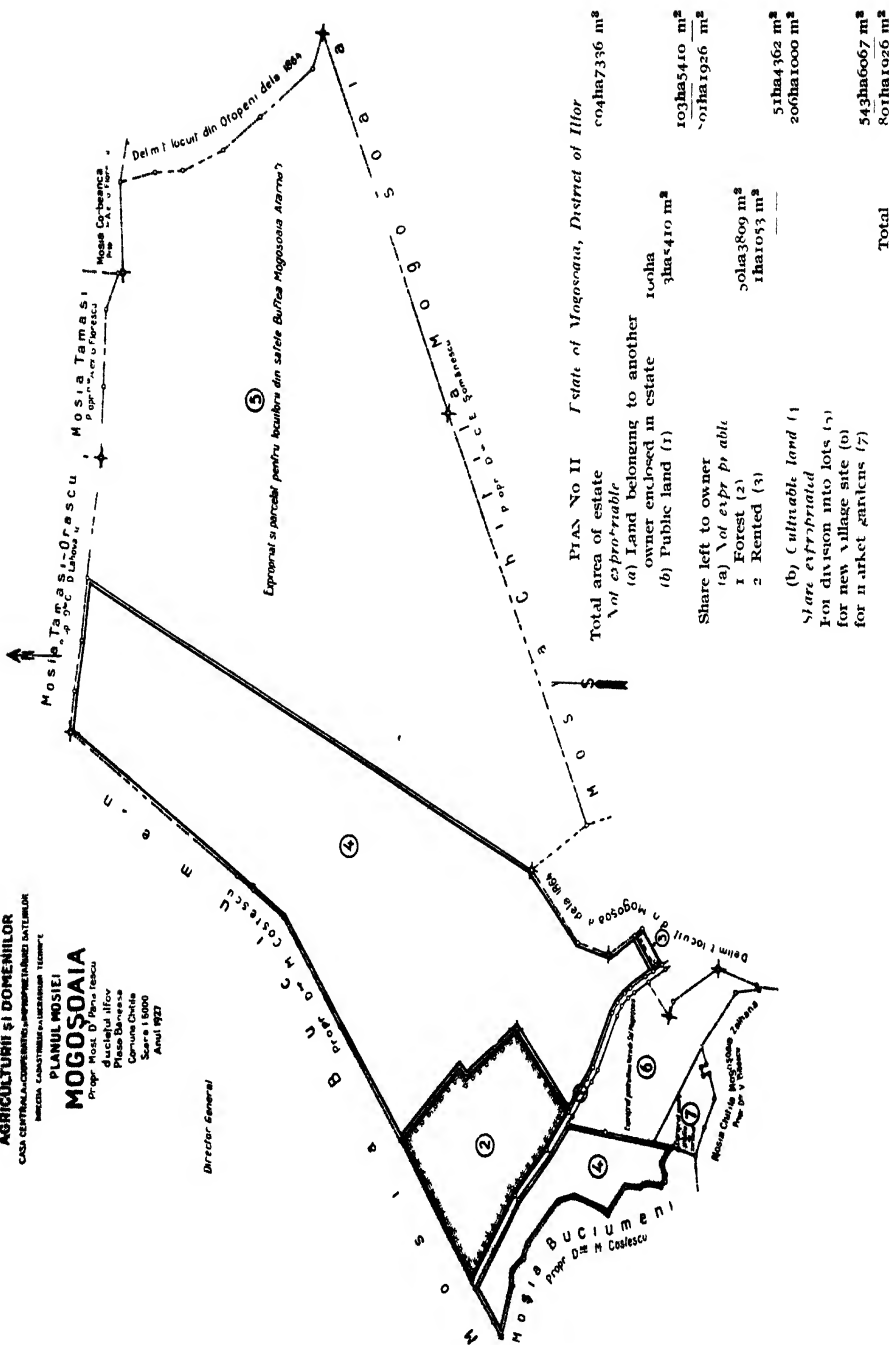
The work of surveying is done in the Old Kingdom and in Bessarabia according to the numerical method, while in Transylvania and in Bukovina it is done by the graphic method. For some time past these latter provinces have also employed the numerical method.

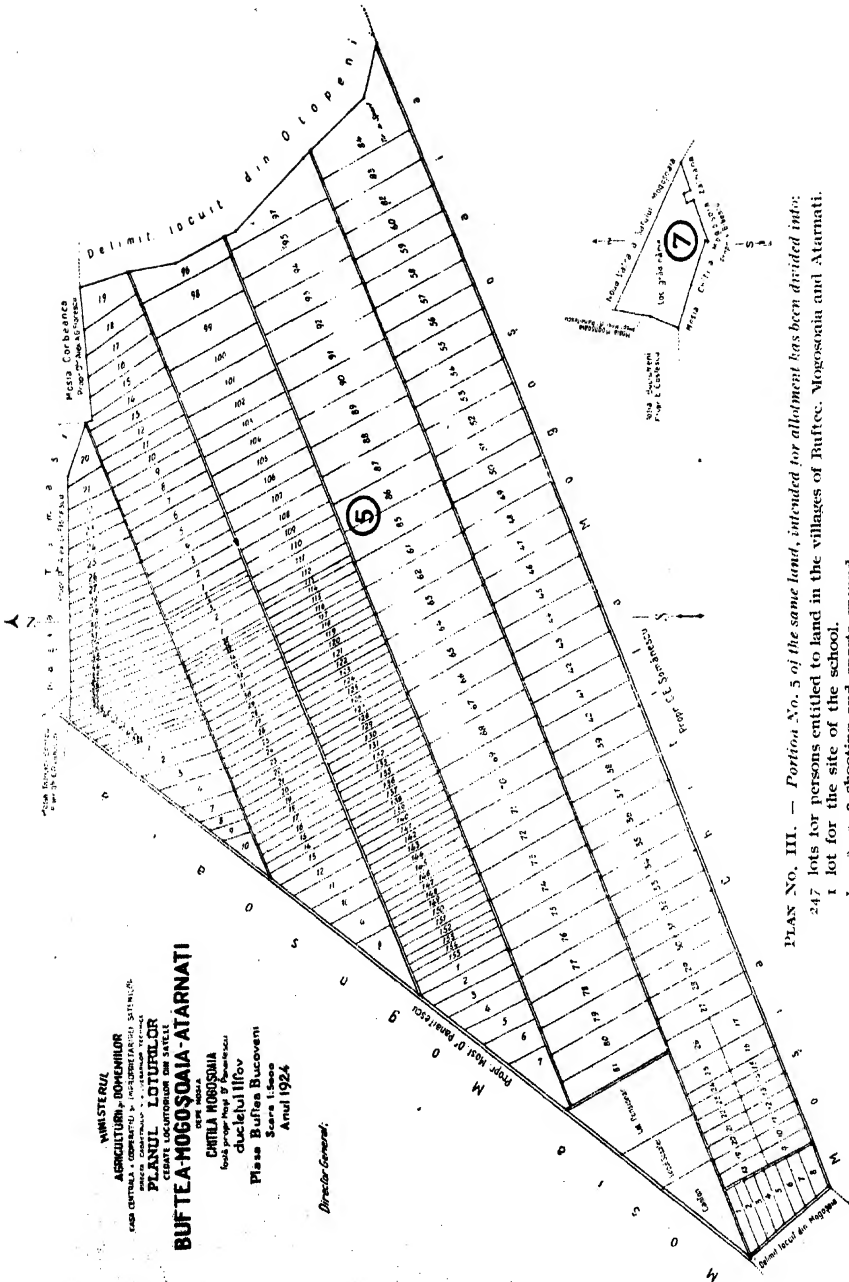
Copies of plans representing the different stages of the work of parcelling are here shown.

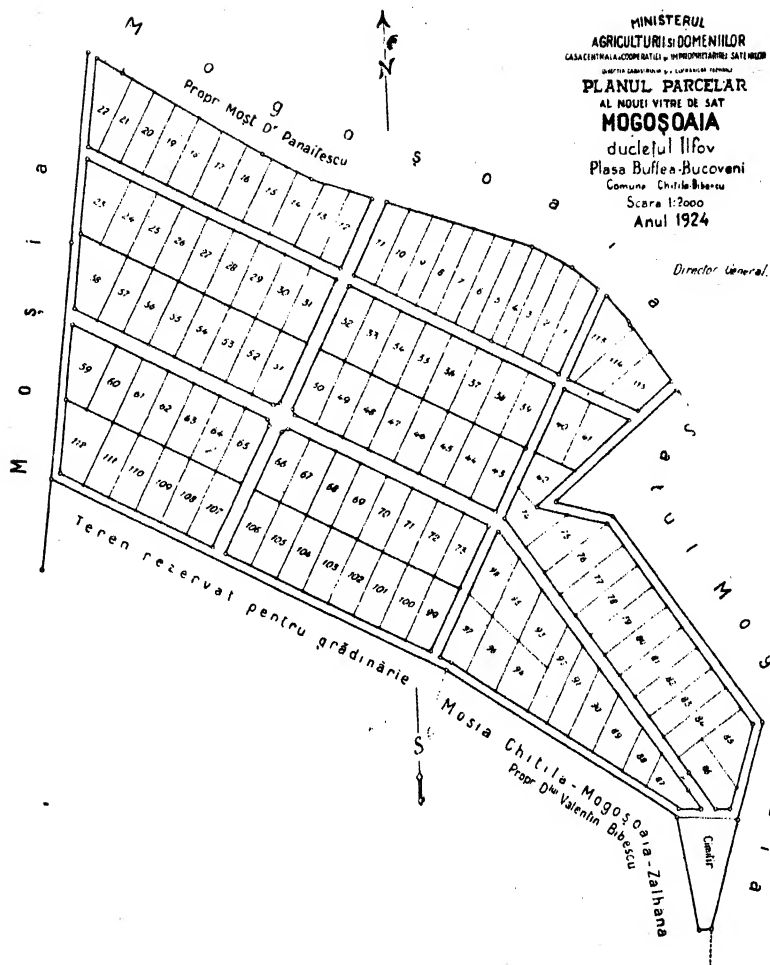


PLAN NO. I. — Estate of Mogosoaia in the District of Ilfov. Triangulation.

According to the latest information supplied by the Land Survey Department, the following surveying and parcelling operations have been carried out up to 1 January 1930:



E



PLAN No. IV. — Portion No. 6 of the same land intended for a new village site and parcelled into 115 lots plus a large plot for the cemetery.

	Surveyed ha.	Parcelled ha.	Sites of villages ha.
In the Old Kingdom	4,618,907	1,821,731	51,227
In Transylvania	1,989,355	865,285	15,807
In Bessarabia	1,437,687	492,350	8,257
In Bukovina	187,518	75,366	—
Total	8,233,467	3,254,732	75,291

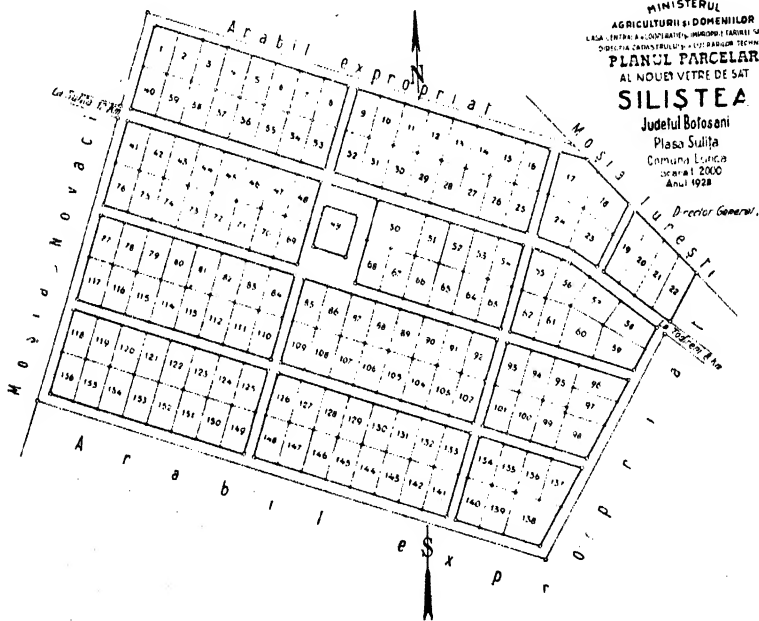
The great difference between the land surveyed and the land parcelled is due to the fact that it is necessary, in order to fix the share to be expropriated, to survey the lands of owners in their entirety, *i. e.*, including the parts not to be expropriated.

The sums paid out by the State for the execution of the surveying and parceling operations amounted, according to the official figures, to 754,433,052.85 lei only, divided as follows :

	Lei
Payment of works	631,741,566.78
Daily expenses for execution and control and cost of transport	48,963,006.14
Material, instruments etc.	73,728,479.93

§ 4. — Land settlement.

The idea of land settlement is an old one and dates, in the Old Kingdom, from the year 1881 when the first land settlement law was prepared, afterwards modified in 1883, 1884 and 1886. With the view to giving effect to this law the State had



PLAN No. V. — A new village site. Commune of Silistea District of Botoşani

250 lots	24ha2539 m ²
	5 » 1001
	—9 » 3590

sold a part of its landed property in lots of 4.6 and 8 hectares and even whole estates had been sold with this object. On this occasion 31,298 hectares were sold to 6,685 peasants.

The second law of land settlement dates from 1889, and was subsequently modified in 1892, 1896, 1899. The object contemplated by this measure was not fiscal as was that of the law of 1881, but one of agrarian policy. It was this law that

enacted that the State lands could not henceforth be sold except to Rumanian cultivators (1). In virtue of this law there were sold in all 881,695 hectares to 86,325 peasants.

In the other provinces a series of land settlements were carried out, some with a political object, the others with an economic one.

At the time of the application of the post-war agrarian reform it was noted that in certain regions the number of persons entitled to land exceeded considerably the number of hectares of land available, that is, of expropriated land. Persons whose claims could not be met were accordingly settled on regions where the contrary had happened, *viz.*, where the quantity of land expropriated exceeded the applications. This measure had a twofold object : to satisfy the greatest possible number of persons, and to bring under cultivation lands where there was a shortage of labour.

Land settlement was effected alike in the Old Kingdom and in the other provinces. In the case of each application the right of settlement was first examined and only those applications which fulfilled the necessary conditions were granted.

The land settlement lots vary from one region to another according to the quality of the land ; in the Old Kingdom they were fixed at 5, 10 or 12 hectares, in Bukovina at 5 hectares, in Bessarabia at 3 and at 6 hectares, in Transylvania at 7, 8, 10 and 16 arpents.

Official statistics of land settlement show that up to the present :

In the Old Kingdom, in Bessarabia and in Bukovina, 27,244 persons have been settled on 293,738 hectares.

In Transylvania 4,274 persons have been settled on 24,596 hectares.

As a large proportion of these settlers had not the means necessary for building a house and equipping a small farm, the State, in conformity with the laws in force, intervened and has up to the present erected 3,190 dwelling houses, 27 coach houses, 44 storehouses for maize, 114 stables and 9 barns, constructed according to plans prepared by the Architectural Department of the Central Bank for the Assignment of Lands.

In other ways also the State gave assistance, especially by providing selected seeds. Up to the present time the payments made by the State for buildings and for seeds for settlers have amounted to 197 million lei.

§ 5. — Consolidation of holdings.

Immediately after the application of the agrarian reform the problem of consolidation became much more acute; the supplementary lots given to peasants rendered the peasant property much more scattered than before; and hence arose the necessity of consolidation for which there was already some provision in the agrarian law.

As this position was still more accentuated in Dobrudja and as the necessity also appeared of regulating the position of the holdings in virtue of the laws of 1924 and of 1930, it was decided to begin the application of consolidation in this province.

Consolidation operations fell into two classes :

1. Those consisting in preparing the plans of consolidation and in applying them to the area, such work being carried out partly by the staff of the Land Survey Department, and partly by the Army Geographical Service.

(1) IONESCU SISESTI, *Politica agrara*, p. 80.

2. The operations of consolidation properly so-called, carried out by special Consolidation Committees composed of agricultural experts and representatives of the peasants. The operations of these committees were supervised and co-ordinated by the Ministry of Agriculture.

Each consolidation deed was based on the list of persons entitled to land, in virtue of legal judgments, and on a consolidation plan covering in a general way the part of the area which was intended for consolidation with indication of the parcels, the land intended for public purposes whether general or local, the property of the State, etc.

Consolidation operations were begun in the course of the month of July 1930 ; out of the 182 communes in the province of Dobrudja, 150 had lists already completed and posted, and in 70 communes consolidation plans have already been applied.

In view of the large staff available for this undertaking it is anticipated that the work of consolidation in Dobrudja will be finished in the course of 1931 (1).

§ 6. — Results.

According to official figures, the areas expropriated up to the present time are as follows :

In the Old Kingdom an area of	2,776,401.43	ha. on	7,181	estates	
In Bessarabia an area of . . .	1,491,920.24	»	»	4,271	»
In Bukovina an area of . . .	75,967.35	»	»	561	»
In Transylvania an area of . .	1,663,809.03	»	»	8,963	»
<i>i. e.</i> , a total of . .	6,008,098.05	»	»	20,976	»

In virtue of the assignment lists established for each province the number of persons entitled to land is as follows :

In the Old Kingdom	1,053,628
In Transylvania	490,528
In Bessarabia	357,016
In Bukovina	77,911
Total . . .	1,978,083

As in certain regions, the area of the expropriated lands has not been adequate to the needs, out of the above the following have received lands :

In the Old Kingdom	630,113
In Transylvania	310,583
In Bessarabia	357,016
In Bukovina	71,266
Total . . .	1,368,978

Since the agrarian reform was resolved upon, as has been previously stated, with the object of ameliorating the uncertain position of the peasant, it was carried out without taking into consideration any of the differences in nationality or religion, alike on the side of the large landowner and on that of the peasant.

(1) Report of consolidation operations prepared by the Land Survey Department, 1930.

Thus in the three provinces which were re-united to the Kingdom as the result of the war, *i. e.*, Transylvania, Bessarabia and Bukovina, where in addition to Rumanians there are other nationalities, foreigners to the number of 206,165 have received land on these terms as compared with 532,700 Rumanians. The distribution in the provinces is as follows:

	Rumanians —	Other nationalities —	Total —
In Transylvania	227,943	82,640	310,583
In Bukovina	42,221	29,045	71,266
In Bessarabia	262,536	94,480	357,016
	532,700	206,165	738,865

In other words 36 per cent. of those to whom lands were assigned were of foreign nationalities.

The area of 6,000,098 hectares of expropriated land has been distributed as follows:

to persons entitled to land . . .	3,629,842.75 ha.	
for communal grazing grounds . .	948,914.15 "	
for communal forests	489,182.96 "	
		5,067,921.86 ha.
for village sites	77,922 — "	
set aside for land settlement . .	320,616 — "	
lands held in emphyteusis . . .	58,008 — "	
unproductive lands	59,841 — "	
reserved for public interests . .	299,659 — "	
remaining at the disposal of the State	124,130.19 "	
		940,176.19 "
General total . . .		6,008,098.05 ha.

Hence more than six million hectares have passed from the hands of the large landowners into those of small holders.

The result of this radical transformation must be, of course, a radical change also in the agrarian structure of the whole country. This will appear more clearly from the following comparative statement of the distribution of the lands as it was before the application of the agrarian reform and as it is now.

Properties from less than a hectare to 100 hectares

	Before the reform — ha.	After the reform — ha.
The Old Kingdom	4,593,148	7,369,549
Bessarabia	2,337,811	3,829,731
Transylvania	4,689,855	6,353,664
Bukovina	405,000	480,967
Total . . .	12,025,814	18,033,911

Estates of more than 100 hectares

	Before the reform ha.	After the reform ha.
The Old Kingdom	3,397,851	621,450
Bessarabia	1,844,539	352,619
Transylvania	2,751,457	1,087,648
Bukovina	115,000	39,033
Total	8,108,847	2,100,750

An examination of the above figures will show that before the agrarian reform the whole cultivable area of the country, *i. e.*, 20,134,661 hectares, was distributed as follows :

Small holdings	12,025,814 hectares or 59.77 per cent.
Large estates	8,108,847 " " 40.23 " "

and after the agrarian reform :

Small holdings	18,033,911 " " 89.56 " "
Large estates	2,100,750 " " 10.44 " "

One of the first results that it was possible to note after the reform, and one which was entirely to be expected, was a perceptible improvement in the standard of living of the new holder of land ; a more wholesome diet, including the use of wheat flour the result of which was the immediate diminution of skin diseases ; a demand on his part for a more roomy and better lighted dwelling ; and above all a tendency to send his children to school. In every way the peasant was clearly desirous of better conditions of life and enlightenment.

It is recognised that the general economy of Rumania has suffered for the time being ; this is inevitable for many reasons, the principal ones being as follows.

The sudden reduction of the large areas under wheat, now replaced to a great extent by maize and barley.

In the second place the product offered by the peasants, who so far possess little technical knowledge and are unorganised, is non-homogeneous and contain extraneous matter, and hence there has been a loss of some part of the foreign markets.

It may be repeated that this was inevitable, since the agrarian reform had to be carried out very quickly, not only in the interest of the country but also in the general interest of the political and social stability of Europe.

In spite of the difficulties inherent in a transformation of this scope in property, and although the post-war peasant found himself suddenly become the owner of his plot of land but with little or no farm stock, live or dead, after the pillage of the war, although he was without credit since none could be had except on exorbitant terms, the Rumanian peasant has none the less risen to the demands of the situation, and has known how to do his duty within his possibilities, showing that he is fully aware of the importance of his function. Before the war the greater part of the peasant population grew only maize and barley ; wheat was grown only for home consumption, and even so in very small quantities as the bread of the Rumanian peasant was mainly "mamaliga" or bread made from maize flour.

In the first post-war years, it is true, the areas under wheat were somewhat reduced, but as soon as the general situation began to improve, wheat growing regained its lost place, thanks to the good will and progressive spirit of the peasant, and this alike from the point of view of the area under cultivation and from that of yield per hectare.

In proof of this, the following table is given of the areas cultivated in wheat, with the total annual production and the yield per hectare, beginning from 1920 :

Year	Areas cultivated hectares	Total production quintals	Yield per ha. quintals
1920	2,022,710	16,685,874	8.3
1921	2,488,335	21,381,484	8.6
1922	2,649,640	25,040,466	9.5
1923	2,690,341	27,792,730	10.3
1924	3,172,102	19,165,444	6.1
1925	3,300,887	28,506,047	8.6
1926	3,327,487	30,177,613	9.1
1927	3,101,153	26,327,072	8.5
1928	3,206,470	31,446,370	9.8
1929	2,737,146	27,148,474	9.9
1930	3,055,900	35,590,780	11.6

On examining this table, it will be seen that in the first place there is a perceptible increase in the areas under wheat, and secondly that there is an increase in the yield per hectare, which, except in unfavourable seasons, is maintained nearly constant. If the average yield per hectare is compared with the average for 1909-1913, viz., 12.9 quintals, in the Old Kingdom, it is clear that the peasant in whose hands is now the whole of the agriculture of the country, is working devotedly for the increase of the production, in spite of all the inherent difficulties.

Further confirmation of this is given by the other tables showing the crop position of the other cereals particularly barley, oats and maize, which cover the greater part of the arable area of the country.

Year	Area under barley ha.	Total production quintals	Production per ha. quintals
1920	1,400,173	14,719,502	10.5
1921	1,569,373	9,852,923	6.3
1922	1,727,454	20,418,064	11.8
1923	1,878,391	13,252,912	7.1
1924	1,850,731	6,697,017	3.6
1925	1,704,061	10,193,278	5.9
1926	1,551,567	16,849,469	10.9
1927	1,764,260	12,617,202	7.1
1928	1,749,212	15,110,386	8.6
1929	2,053,537	27,404,537	13.3

Oats.

1920	966,393	9,920,897	10.3
1921	1,339,006	9,631,684	7.8
1922	1,333,522	13,364,502	10.1
1923	1,345,402	9,095,960	6.7
1924	1,236,580	6,098,215	4.9
1925	1,184,847	7,400,625	6.2
1926	1,078,419	11,590,287	10.7
1927	1,084,408	8,681,434	8.0
1928	1,116,450	9,804,376	8.8
1929	1,212,700	13,592,924	11.2

Maize.

1920	3,295,418	46,238,468	14.1
1921	3,443,990	28,103,708	8.1
1922	3,403,854	30,421,949	8.9
1923	3,404,492	38,458,493	11.3
1924	3,621,454	39,488,691	10.9
1925	3,930,780	41,591,467	10.5
1926	4,059,432	58,398,509	14.4
1927	4,219,423	35,331,462	8.4
1928	4,455,492	27,563,720	6.2
1929	4,794,952	63,861,811	13.3

It should be repeated that account should be taken not merely of the difficulties through which agriculture has passed and is now passing, but also of the weather conditions which in 1924 and 1925 were completely unfavourable, and of the fact that in 1929 a great part of the wheat sown was frozen during the winter.

The increase in production is still far, of course, from ensuring a profit to the grower, in view of present prices. We are however convinced that the numerous measures taken by the State with a view to the intensification of agriculture will shortly have their effect. These may be summarised as direct measures for the improvement of sowing, by means of a premium of 35 per cent. granted to growers who employ selected seeds, and of grants in aid of 20 millions lei in 1929 and of 36 millions in 1930 made to the Chambers of Agriculture, to be distributed in grants to the growers of the best wheat for the purpose of purchasing screening machinery and seed drills. These will be placed at the disposal of farmers at reduced prices through the agency of the Chambers of Agriculture.

Other measures designed to increase production are : the endowing of the Institute of Agricultural Research with the funds required for the study of the principal problems, the establishment of stations for cleaning of seeds, a wide measure of reform in agricultural instruction, including the organisation of travelling instruction, the organisation of State model-farms, the reform of the co-operative system, and the organisation of Chambers of Agriculture.

The most important problem to be resolved and the one to which the Government is now giving attention is that of agricultural credit, which it is hoped will be solved before long with the help of foreign capital.

The large estates which suffered mutilation from the operations of the reform are beginning to recover. The owners have learnt that from henceforward only an intensive cultivation can possibly be profitable, and have set to work courageously on these lines, and are not allowing themselves to be disheartened by the difficulties of the present crisis.

In addition they have the satisfaction of duty accomplished ; by the sacrifice to which they voluntarily agreed they saved the national economy of the country and ensured order and peace. As was said by Prof. Charles de Wischer, of the University of Ghent, in speaking of the agrarian reform in Rumania : " It appears on the first count as a measure designed to save the threatened national economy and as a law for the public safety ".

February, 1931.

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MONTLHY BULLETIN

OF

AGRICULTURAL ECONOMICS AND SOCIOLOGY

NOTES

Final Act of the International Preparatory Conference of the IInd World Wheat Conference (Rome, International Institute of Agriculture, 26 March-2 April 1931).

The official Delegations of the following Countries :--

Germany,	Hungary,
Argentina,	Italy,
Austria,	Eritrea,
Belgium,	Cyrenaica,
Belgian Congo,	Italian Somaliland,
Bolivia,	Tripolitana,
Bulgaria,	Japan,
Denmark,	Latvia,
Egypt,	Lithuania,
Spain,	Mexico,
Estonia,	Norway,
Finland,	Netherlands,
France,	Peru,
Algeria,	Persia,
Morocco (French zone),	Poland,
Tunisia,	Portugal,
Great Britain and Northern Ireland,	Rumania,
Australia,	Sweden,
Canada,	Switzerland,
India,	Czechoslovakia,
Union of South Africa,	Turkey,
Irish Free State,	Union of Socialist Soviet Republics,
Greece,	Uruguay,
Guatemala,	Yugoslavia,

have met on the invitation of the International Institute of Agriculture and at the Palace of the Institute from March 26 to April 2 for the International Preparatory Conference of the IInd World Wheat Conference.

* * *

Representatives of the Secretariat of the League of Nations, of the International Labour Bureau, of the International Co-operative Alliance, of the International Chamber of Commerce, of the International Commission of Agriculture, of the Permanent International Commission of Agricultural Associations (C.I.P.A.), of the Agricultural Delegation of the Economic Committee of the League of Nations and of the Interparliamentary Union also took part in the Conference, in the capacity of Observers or as persons invited by the Institute. In addition, the Institute had invited the full members of its Agricultural Economic Committee, to take part in the work of the Conference and to hold their IIIrd Session during the course of the meeting.

* * *

In connection with the work of the Conference, the International Institute of Agriculture, which likewise made all arrangements for the work of preparation, had prepared a special documentation, comprised in five pamphlets bearing the following titles :—

- (1) Note on the situation of the world wheat market ;
- (2) Principal measures adopted in the various countries in view of the wheat crisis ;
- (3) Recommendations and resolutions of recent international meetings, relating to wheat ;
- (4) Note on International Agricultural Credit ;
- (5) Statistical documentation on the production of, trade in and price of cereals.

Appendix : Texts of Laws relating to cereals.

* * *

The Conference invited His Exc. Senator Giuseppe De Michelis, Ambassador, President of the International Institute of Agriculture, to act as its President.

It constituted its Presidential Bureau as follows : His Exc. Baron Acerbo, Minister of Agriculture and Forests of the Kingdom of Italy ; His Exc. Count Karolyi, Minister of Foreign Affairs of the Kingdom of Hungary ; His Exc. M. Madgearu, Minister of Agriculture of the Kingdom of Rumania ; His Exc. Dr. Dollfuss, Federal Minister of Agriculture and Forestry of the Austrian Republic ; His Exc. M. François-Poncet, Under-Secretary of State to the President of the Council and of the National Economy of the French Republic ; His Exc. M. Ahmed Abdelwahab Pacha, Under-Secretary of State to the Ministry of Finance of Egypt ; Dr. Hermes, Deputy, former Minister of the German Reich ; His. Exc. M. Lebreton, former Minister, Ambassador of the Argentine Republic to the President of the French Republic ; Mr. MacDougall, Trade Commissioner of Australia in London ; M. Mullie, Senator of the Kingdom of Belgium ; the Hon. George Howard Ferguson, High Commissioner of Canada in London ; Sir Ronald Graham, Ambassador of His Britannic Majesty at the Court of H. M. the King of Italy ; His Exc. M. Seya, Special Envoy and Minister Plenipotentiary of Latvia at the Court of H. M. the King of Italy ; His Exc. M. Wagnière, Special Envoy and Minister Plenipotentiary of the Swiss Federation at the Court of H. M. the King of Italy : Prof. Kritsman, Vice-President of the State

Commission for the Economic Plans of the Union of Socialist Soviet Republics; M. Louis-Dop, Delegate of France and of the French Colonies on the Permanent Committee of the International Institute of Agriculture, Vice-President of the Institute.

Prof. Brizi, the Secretary General of the International Institute of Agriculture, was elected Secretary General of the Conference and appointed the Secretariat of the Conference, composed of members of the staff of the International Institute of Agriculture.

* * *

The International Preparatory Conference of the IIInd World Wheat Conference first examined the questions on the agenda, during the course of a certain number of plenary sessions.

It then formed three Commissions: the first for the *International Organisation of Wheat Production and the Wheat Trade*, the second for *International Agricultural Credit* and the third for the *Preferential Tariff System*.

The Presidents of these three Commissions were MM. François-Poncet (Ist Commission), Mullie (IIInd Commission) and W. Stucki (IIIrd Commission), who submitted the reports of their respective Commissions.

In addition the Conference judged it opportune to entrust to a special Committee, chosen from among the Delegations of the exporting countries, the task of preparing a further meeting of all the exporting countries, both European and Overseas. This Committee held a meeting during the Conference.

The results of the debates during the plenary sessions and the work of the Commissions have strengthened the conviction of all the members of the Conference that the present wheat crisis can only be studied and solved effectively on the international plane.

Consequently, it is in this spirit, that the Conference, during the final session which followed the conclusion of the work of the Commissions, adopted the following resolutions:—

I.

INTERNATIONAL ORGANISATION OF WHEAT PRODUCTION AND OF THE WHEAT TRADE.

(1) The International Preparatory Conference of the IIInd Wheat Conference recommends examination of the possibility, in countries where wheat is already consumed, of considering the means of developing such consumption. It also recommends a strong publicity campaign in order to popularise the consumption of wheat in countries where it is not at present largely used. It is of opinion that in order to give full effect to this publicity, it would be desirable to sell off at low prices in such countries, part of the stocks, which overburden the world market.

(2) It recognises that the European countries, for manifold reasons, economic, social or political, are unable, either to give up the cultivation of wheat or to allow it to be neglected.

(3) It recognises that it is impossible to secure a general reduction in the areas sown throughout the world by the direct method of obligatory restriction, whether advocated by an international body or by national bodies.

It is convinced that the reduction of sowings can only be obtained by natural methods, by the farmers themselves, influenced by the conditions of the market and a study of the figures and of the facts.

It recommends that in countries which consider it advisable, this influence should be reinforced by an educational propaganda among the producers.

(4) The Conference considers that, in order to secure the solution of the wheat crisis, it is particularly necessary that there should be an improved organisation of the wheat market. Such organisation should be brought about rather by a gradual and progressive policy, based step by step on the results obtained, than by any policy that claims to cover every aspect of the problem.

In order to reach a rapid solution, it recommends the countries interested to concentrate their efforts for the present on some particular, definite and limited object, such as the disposal or the organisation of the carry-over of existing stocks.

(5) The Conference is glad to note that the wheat exporting countries, Overseas and European, have decided to draw-up together a scheme to deal with the wheat export season 1931-32 and with existing stocks, and that they will meet for this purpose, under the presidency of the Hon. George Howard Ferguson, High Commissioner of Canada, in London, on 18 May.

(6) At the same time the Conference recommends the different buyers in those importing countries where the need should make itself felt to endeavour to form organisations for the purchase of imported wheats. Such organisation may take any form whatever which may be suitable in view of the particular situation in each country.

(7) The Conference considers that the International Institute of Agriculture and the Economic Organisation of the League of Nations should follow closely the efforts to be made by the various countries in the sphere of wheat production and trade, in order to be in a position to take in full agreement such steps as current experience may suggest.

(8) It considers that the improvement of the organisation of world wheat production and trade largely depends on an improvement in the provision of information and of statistical forecasts.

It expresses its confidence in the International Institute of Agriculture as a means for co-ordinating the statistical data of the various countries in this respect, for checking and interpreting the figures, for supplementing the documentation from official sources by such professional or commercial documentation as may throw light on the problem, for facilitating the utilisation of statistical information and for making it available without delay by the interested parties.

The Conference recommends all the States to increase the financial resources available for the International Institute of Agriculture, in order to enable the Institute to carry out this work to best advantage.

II.

INTERNATIONAL AGRICULTURAL CREDIT.

(1) The Preparatory Conference of the IInd World Wheat Conference has examined with special attention the part which a systematic organisation of agricultural credit can play in improving the general situation of agriculture, and in particular, in overcoming the grain crisis.

It is of opinion that it is more than ever necessary to be able to obtain for farmers

and in particular for wheat growers at low rates of interest, the capital of which they have need, and that, with that object, it is desirable to examine, from an international point of view, the question of agricultural credit, which differs from commercial credit in the forms imposed upon it by the special conditions of agricultural production.

(2) With regard to medium term and long term credit, which serves principally to enable farmers to purchase equipment and stock, to acquire or to enlarge a holding, to carry out land improvement and to effect transformations in systems of cultivation, in order to restrict, when desirable and possible, the area sown to cereals and to develop the cultivation of crops which can advantageously replace them, the Conference is pleased to learn that the Financial Committee of the League of Nations, taking account of the studies made by the International Institute of Agriculture, is at present contemplating the formation of an international mortgage credit institution.

It expresses the wish that this organisation should as quickly as possible be in a position to supply, at the most favourable rates, medium term and long term credit to the farmers of all countries.

The Conference is of opinion that medium term and long term credit is as useful to corporate bodies as to individuals and that it should also serve to facilitate the construction of elevators, of silos and of co-operative warehouses, and the organisation of co-operative societies for the marketing of grain and of other agricultural products.

The Conference points out that medium term credit can also be useful to farmers who are not the owners of their farms as, in default of mortgages, they can give other effective security, such as agricultural warrants, liens on crops, sureties, or joint and several guarantees.

(3) The Conference notes that in the present crisis, short term agricultural credit is of particular importance and that it should be encouraged as much as possible by the Governments of the different countries.

This form of credit, in fact, can enable farmers and particularly grain growers to avoid hasty sales immediately after the harvest, which lower and disturb the course of prices, to the detriment of the producer and without benefit to the consumer. By facilitating the substitution of other crops for wheat, and systematic and orderly marketing by individual farmers as well as by co-operative societies, short term agricultural credit can contribute to a rationalisation of production, to a greater stabilisation of prices, and to a better organisation of exports and of markets.

In this regard, the Conference is of opinion that the transfer of capital may advantageously take place between countries where it is plentiful and cheap and those where it is scarce and costly, and that it is necessary to study the means of facilitating such transfer of capital on an international scale in order to develop short term agricultural credit in all countries.

(4) The Conference again expresses the opinion that it is desirable to provide exporters with the credit necessary for speeding up the clearance of stocks and that in particular transport agencies, bonded and general warehouses and shipping companies might with advantage intervene here by utilising the credit which such bodies have already at command.

Thus as proposed by the Committee established by the Commission for the study of the question of European Union, it might become possible to consider for the purpose of discounting bills a fuller utilisation of those markets on which the rate of interest is low, the issue of warrants on merchantable products, and the possible introduction of the system of a negotiable way-bill.

(5) The Conference requests the International Institute of Agriculture to continue its studies relating to agricultural credit, and to endeavour to draw up a general scheme for the organisation of short term agricultural credit.

III.

PREFERENTIAL TARIFF SYSTEM.

The Conference has noted that the discussion on the preferential tariff system, which took place in the Commission appointed to consider this question, was based on an appendix to the report of a Commission of the IInd Conference in favour of a concerted economic policy, which met at Geneva in November 1930. The discussion has been carried as far as is at present possible in the field of multilateral conversations.

The principal difficulty encountered by the Commission lay in the fact that the Delegates of several important wheat exporting countries declared that they did not possess the materials necessary to enable them to estimate the possible loss which they might suffer as a result of the preferential system, nor the possible advantages that they might be able to derive therefrom.

Hence, if the interested countries, who are prepared to make trade agreements on a preferential basis, desire to continue the discussion, it will be necessary for them to have recourse to diplomatic channels.

The Commission also ascertained that all exporting countries have the same interest, in so far as they all desire to see the European market strengthened, so that they may obtain remunerative prices for their cereals.

* * *

The above resolutions were adopted by the Conference unanimously, except for the abstention of the Delegation of the U. S. S. R. as regards Chapter I — in accordance with the reserves expressed as regards Nos. 1 and 7 of this chapter, as to the remainder of which the Delegation is favourable — and the contrary vote of the same Delegation regarding chapters II and III.

* * *

The intention of the Preparatory Conference, in adopting the resolutions set out on the previous pages, has been, on the one hand, to indicate to persons interested throughout the world the paths that may be followed and the means that may be adopted to bring about better conditions on the Wheat Market and, on the other, to provide the International Institute of Agriculture with a proper orientation of its work of preparation for the IInd World Wheat Conference, which the authorities of the Institute have arranged to call in 1932 as the various Government have already been duly informed.

The Preparatory Conference considers that it is a particular happy circumstance that the means should have been found for the consideration and discussion of questions of great importance and of extreme delicacy in a meeting attended by a large number of authorised representatives of the exporting and of the importing countries of five continents, all of whom were fully persuaded of the urgent necessity of finding a remedy for the present situation.

(Signature).

CO-OPERATION

Agricultural Co-operation in Hungary.

I. THE PRE-WAR AGRICULTURAL CO-OPERATIVE MOVEMENT.

The first co-operative organisation connected with agriculture in Hungary was a Mortgage Credit Institute which began activity in 1863. The essence of its constitution lay in the fact that in addition to founder members who were all land owners, the borrowers also had the right of voting. This Institute is still in existence and is one of the principal mortgage credit institutions in the country. Since however from the character of its organisation it was calculated mainly to meet the requirements of the large land owning class, there was founded in 1879 on similar lines a Mortgage Credit Institute for Small Farmers which is also in existence at the present day. These two institutes obtained privileges in virtue of a special law and also receive financial support from the State.

The establishment of these large co-operative societies in no way solved the problems of personal credit, although under the stress of the agricultural crisis that began in last century these took on a very serious aspect. Beginning from 1879, the question was dealt with by a series of various agricultural organisations, there was a growing consensus of opinion in favour of a co-operative solution, and finally in 1886 there was founded by the initiative and with the effective collaboration of Count Alexander von Karolyi the Co-operative Credit Society for the Comitatus (or Department) of Pest. Partly owing to the active propaganda carried on by this society and partly by force of example, a definite movement for co-operative credit took shape from this time, and within seven years nearly 120 co-operative credit societies came into being. As the natural outcome of this movement in 1894 the Co-operative Credit Society for the Comitatus of Pest was transformed into a Central Credit Institution for the Co-operative Societies of Hungary thus becoming a Central Banking and Audit Union. From this was formed in 1898 the National Central Co-operative Credit Union which is to-day the central point of the co-operative credit system and the instrument for financing the whole of the co-operative movement.

The development of other branches of agricultural co-operation has not been fully continuous. At the time of the great drought of 1862-63 grain warehouses were established in Hungary. During the autumn the farmers who were in a position to assist other cultivators stored grain in a common warehouse for those in need, so that when their own stores were exhausted in the spring these latter could obtain from the stores loans in kind on which the lenders received interest. These store houses were not purely charitable organisations; the idea of mutual aid was also inherent in the institution. It was however only after the lapse of nine years that the first co-operative society for agricultural production made its appearance under the form of a co-operative wine-making society, which took the name of the Transylvanian Union of Co-operative Wine Making Societies. Others came into existence in the course of the same decade, and at the beginning of the following decade the first co-operative dairy was set up. Up to 1895 another 17 societies of the same kind appeared but without State support they could make no headway in the villages. It was only when the Ministry of Agriculture took the matter in hand that a real impetus was given to the movement.

The first attempt at a general co-operative marketing society is represented by the formation of a society in 1888 the object of which was to supply the products

of members directly to the army. In consequence of the many difficulties this programme was abandoned in 1891 by the society which then amalgamated with the Co-operative Association of Hungarian Farmers, founded some months earlier. This latter very shortly afterwards developed an extensive business in purchase and sale of agricultural commodities and established direct relations with the Army Commissariat Department. It is at the present time the largest co-operative supply organisation in Hungary. An interesting experiment was made by a society which was founded in 1893 with the object of bringing the produce of members to the markets of the capital without the intervention of intermediaries. It lasted up to 1913.

The fact that up to the end of last century no co-operative marketing societies had been founded as such, is to be partly explained from the marketing activity undertaken by co-operative credit societies and also by agricultural consumers' societies the number of which had rapidly multiplied since 1898. Speaking generally, the influence of the Raiffeisen system is also to be traced here, in the fact that there was an attempt to combine the financial side with both the purchase and sale of commodities in one and the same co-operative organisation. The co-operative marketing of that most important product, grain, was also carried on through the agency of co-operative credit societies. The financial operations were however kept distinct as regards administration from the handling of the commodities.

The members of the co-operative society who desired to arrange for joint sales combined into a special group within the co-operative credit society. Group rules were established, not of course in any way conflicting with the rules of the co-operative society itself, and only relating to the transactions in grain. A single group also came to be formed of the members of several neighbouring co-operative societies, but in this case also the lending organisation was a single co-operative society which was responsible also for the supervision of the group. The business was naturally done in the name of the society since that and that alone had the status of a corporate body; but as an internal arrangement one of the members of the board of directors was in charge of the administration of the business relating to grain. A group could not be formed in the first place unless there was an expert on the spot whose services could be obtained and who could combine the direction of the business in grain with his main occupation thus making it practicable to avoid heavy administration expenses.

The basis of the group organisation was the warehouse which was sometimes rented but more often put up by the group itself. Five sixths of the cost of construction, as well as installation expenses etc., are borne by the State, the rest by the co-operative society. The ownership rights remained with the State, or rather with the representatives of the State in the National Central Co-operative Credit Union, which usually advanced to the co-operative society that part of the costs that it had to meet, and also supervised the whole of the grain transactions. The majority of the warehouses were of course situated close to railways.

The services rendered to members by these so-called co-operative grain warehouses were of three kinds: the handling and grading of the grain, cash advances, and sales. The cash advances extended to 75 per cent. of the market price; the sums required were placed by the Central Co-operative Union at the disposal of the society. In regard to sales, the co-operative society acted as commissioner. These societies regarded the direct supplies to the army as the most important section of their activity. Members who deposited more than one truck load, or reserved to themselves the disposal of more, themselves fixed the time of sale; usually however it was the rule that the warehoused grain was sold in three lots (at end of October,

end of December and mid May) so as to secure an average price. Hence this system may be said to have embodied, although in primitive form, the idea of a pool.

On the whole this system worked well, and the number of co-operative grain warehouses grew steadily, although at no time rapidly. They could not however acquire any special importance in the grain trade of Hungary. It was quite otherwise with the co-operative dairies the number of which rose from 34 in 1897 to 587 in 1911, with a daily milk yield from nearly 100,000 cows. The State gave generous support to this movement, but there was no central organisation for expert direction and control. For this reason progress was checked during the last years before 1914, although good results of every kind were obtained as regards milk supply of the different regions.

The vine growers' co-operative societies were, like the co-operative grain warehouses, mainly formed through and in federation with the National Central Co-operative Credit Union. On the other hand, a Central Union was formed in 1898 for livestock insurance societies. A National Co-operative Union was founded in 1909 for the purposes of other branches of insurance. The movement for agricultural consumers' co-operation began also in last century by the foundation of the central co-operative Union "Hangya" ("The Ant") in 1898, and from then-onwards made remarkable progress.

At the time of the breaking out of war, the Hungarian agricultural co-operation was characterised as follows: for all the most important branches there were in existence the necessary conditions for a fuller development; although there were no signs of rapid progress on the other hand there was no decline. Certain characteristic features were noticeable: the construction from above downwards, first the Central Unions, then the co-operative societies; a far-reaching support including financial support on the side of the State; the Raiffeisen principle; the utilisation of the co-operative credit societies also for both aspects of the trade in agricultural products, viz. the buying and the selling.

II. EFFECTS OF THE WAR AND OF THE INFLATION PERIOD ON THE MOVEMENT.

A completely new series of economic conditions was brought about by the war which operated in the direction of the destruction of the co-operative organisation. The leading personalities of the local co-operative societies and the members of the staff were called to arms, and so also were the members, leaving their farms to be worked by women or persons under age. This was often equivalent to a breaking up of the farm, the consequences naturally affecting also the co-operative society. Measures were very soon taken to prevent the free transfer of agricultural estates; and on the other side the sale of many farm requisites, which were regarded as material of war, was controlled by authority. In countries where there already existed a marketing organisation which could be placed at the service of the national economy, this situation may have operated favourably, but in Hungary it meant the stifling of the development of the co-operative societies. The constantly growing demand on the part of the army for meat meant the destruction of a great part of the livestock which made the co-operative dairies and the livestock insurance societies useless. The consumers' co-operative societies only assumed importance, as in the villages manufactured goods and in the towns food stuffs could only be procured with difficulty and monopoly trading in commodities soon began and was not slow to spread.

Thus at the end of the war, the Hungarian agricultural co-operative movement

was almost wiped out. Then came the worst blow of all : the division of the territory of the country robbed the co-operative organisation also of lands of considerable extent. The following table shows how the situation has been changed by the war :

		Number of the co-operative societies	Number of members	Share capital millions	Loans made in pengös	Turnover in gold crowns
Credit co-operative societies	1914	2462	685,000	46.8	304.7	
	1920	919	271,000	0.43	5.0	
Agricultural con- sumers' societies	1914	1380	292,000			57.0
	1918	2140	658,000			107.7
	1920	1007	454,000			52.4

The dismemberment of the territory brought about the loss to Hungary of 1605 co-operative credit societies (58 % of the total) with 421,000 members (61 %), and 1347 consumers' co-operative societies (69 %) with 300,000 members (46 %). With them disappeared warehouses, creameries, savings banks, loan institutions, etc. ; in short the actual loss was greater than can be expressed by figures, because the unity of the organisation was destroyed.

Nor was this disaster all ; there quickly followed the period of after war crisis which is usually known as the inflation period. The state of economic malaise seemed at first to be favourable for the co-operative societies. The continuous but of course only apparent rise in prices facilitated every kind of economic enterprise, and the co-operative societies could count upon the sympathy of all classes of the population at a time of extortionate interest charges and scarcity of merchandise. All this was favourable to the newly formed organisations, the majority of which were unsound. Among the existing societies, the co-operative sale societies went through difficult times, because in view of the ease and advantage with which sales could be effected their services were not required. The co-operative purchasing societies on the other hand, whether co-operative credit societies or societies for the purchase of requisites, were much sought after, because moderate rates of interest were offered and because, especially at the beginning of the inflation, the standpoint of full valorisation was not generally adopted either for the repayment of loans or in the calculation of prices, although this was done by the banks and in connection with trade.

When the co-operative societies made up their balance sheets in 1924 at the beginning of the deflation, the following was the general aspect : capital had shrunk to practically nothing : (with the co-operative credit societies this was due to their investment of large sums in war loans of which the market value only represented a negligible fraction of the nominal value) ; the societies constituted a very extended organisation, the upkeep charges of which could not be met from the business which was greatly diminished by the deflation now beginning ; the confidence of the farmer was shattered by the formation of numerous societies which were co-operative only in name, especially in the sphere of agriculture. In a word the balance was unfavourable. It was then that the agricultural crisis began to make itself felt.

III. RECONSTITUTION OF THE CAPITAL OF THE CO-OPERATIVE SOCIETIES.

Since 1924 to the present time the main efforts of the Hungarian co-operative societies have been directed to the regaining of their forces of capital. It will be obvious that the State had to do its part in this respect. The actual sums involved cannot be ascertained ; in any case it is a question of considerable amounts which however fall far short of the sums lost during the inflation period. The form taken by the State support was partly that of subscription of share capital, partly of concession of loans. Some few years ago it became usual for the State to arrange both these forms of assistance through the medium of the Central Co-operative Credit Union, which in this way became a kind of central co-operative bank.

Since the crisis is in part due to the want of capital in agriculture, a large share of the work of supplying capital falls at the present time on the co-operative credit societies. These organisations give special attention to the conversion of short term loans on bills into medium term credits on promissory notes, which are better suited to agriculture. Progress in this direction is very slow ; in 1929 there were 32.4 million credits on promissory notes — for a period of five years — as against 110.5 million *pengös* in credits on bills.

With a view to reduction of the need for long term mortgage loans the Central Co-operative Union approached the American money market and placed mortgage bonds to the value of three million dollars which it made available for farmers for 98 per cent. of the value and at a rate of 8.75 per cent. The requirements of working credit were partly met in the form of export credits, which were granted partly on cereals, partly on slaughter cattle and pigs, making up a total sum of 38.3 million *pengös*. The sums were liquidated by the State.

The local co-operative credit societies were available only for the small farmers of the district. Accordingly in view of the credit needs it became necessary to make co-operative credit also accessible to the owners of large and medium-sized farms. With this object the so-called District co-operative credit associations were formed to the number of six.

Efforts are being to increase deposits as a means of increasing funds for working expenses, and in particular there is a movement for investing public money that may be temporarily available in the funds of the agricultural co-operative societies.

The following figures will give some idea of the position of agricultural co-operative credit societies at the end of 1929 :

	Central Co-operative Credit Union	Local and District co-operative credit societies
Millions of pengös		
Share capital	18.7	28.5
Reserve capital	2.2	—
Deposits	152.2	34.0
Loans	184.0	174.9
Number of societies		1,016 societies
Number of members		358,650 persons

IV. FOUNDATION OF THE "FUTURA" OR CENTRAL TRADING COMPANY.

If the granting of credits on favourable terms is one factor in the struggle against the agrarian crisis, the other one is improvement in marketing. The pre-war system of co-operative marketing was in itself weak, and it was completely shattered by the war and post-war conditions, so that the whole had to be built again from the beginning. Speaking generally, fundamental principles were followed, that is to say, in the restoration of co-operative marketing the existing organisations were taken into consideration, and primarily the co-operative credit societies. In particular this applies to the most important product of Hungary, grain.

In 1928 the aggregate value of the agricultural products was 2,484,000,000 *pengös*; including for the different kinds of cereals and for maize, 1,462,000,000 *pengös*, or 59 per cent. The possibilities for marketing cereals, including maize, form thus a decisive factor for the farmer. With a view to ensuring uniform co-operative marketing of these products there was founded in 1920, with the participation of the State and of the two principal central co-operative unions, *viz*, the co-operative credit Union and the co-operative consumers' Union, a "Futura", a share company for trading in commodities of the central co-operative societies.

As already explained, the ruling conception is that it is wiser from the economic standpoint to make use of the already existing co-operative system also for marketing. As regards direction, of course, a completely different technical capacity is required from that required for the work of the credit or consumers' co-operative central unions. In relation to marketing the share company "Futura" takes its own place. It acts as a commission agent for societies where conditions are present that call for such assistance; for example, for one society expert direction will be found at small expense, because the work can be undertaken as a subsidiary occupation; another society will be informed where it can obtain cheap storage space, in another case the Company will recommend the co-operative society which can assume liability in grain trading. In 1929 there were 142 societies thus assisted by the Company, including 105 co-operative credit societies, the remainder being consumers' societies. In that year also "Futura" had 17 branches and 130 sub-agency offices, and was represented in 289 localities in Hungary.

The "Futura" makes daily reports on the prices at which the society may buy. The prices are always calculated at the parity most favourable for the localities concerned. The Company in any case pays the commission premium, so that the co-operative society can make a deduction from the price paid to the farmer only on the ground of inferior quality. The consequence of the intervention of the "Futura" is that the grower always receives the full price, due to him on the basis of the ruling world price.

At the present time the Company has no other object in view. Naturally it accepts grain only if properly handled and to a certain extent thus influences the improvement of the quality.

The capital required for purchase is placed by the "Futura" at the disposal of the co-operative society. The limits of this advance is fixed by the Company in relation to the share capital of the society, taking into account also the private resources of the members of the board of directors, who are personally liable for the trading.

A special and possibly more practically important activity of the "Futura" is that of making cash advances on cereals in the field or in the barn. These advances are limited to 75 per cent. of the price of the day, with an interest that is

only one per cent. higher than that of the National Bank. For standing crops, the period for which the credit is granted is fixed beforehand; for cereal crops already reaped it is calculated in three instalments: December, February and April, so as to ensure to the grower as far as possible the average price. The grower may however fix the price earlier on a day chosen by himself when it will be calculated on the basis of the market price of that day.

The Company operates mainly on the export market. In 1929 three per cent. of the wheat export was handled by the Company. It extended its operations also to maize, barley, etc. as well as to wool and feathers. The share capital amounts to 2 million *pengős*.

The second important organisation for co-operative grain marketing is the Co-operative Association of Hungarian Farmers mentioned earlier. This is a centralised large scale co-operative association mainly connected with the large landowners. It sold in 1929 238,000 quintals of wheat to the value of 4.8 million *pengős*. Its transactions in slaughter pigs are also considerable. Its co-operative fattening establishment is also placed at the disposal of farmers who have not enough capital to purchase feeds, and here pigs are fattened on feeds supplied in advance by the co-operative society for a certain rate of payment. After selling the pigs a settlement is made with the members. In 1929, 8000 pigs were sold in this way. The association also makes purchases on a considerable scale, and in 1929 the whole turnover was 12.7 million *pengős*.

V. CO-OPERATION IN DAIRYING, IN WINE-MAKING AND IN SALE OF PRODUCE.

As a result of the efforts for intensification made during the period of economic restoration, there has been a considerable development of the milk industry, a development that was the more fully appreciated by the farmers from the fact that in the first post-war year in consequence of the diminution of the head of live stock the demand has been much greater than the supply. In 1925 there was a tendency for this situation to be reversed, and difficulties in marketing began to be encountered, although the demand for milk continued to increase. This resulted in a lively interest in co-operative dairying.

The number of co-operative societies in existence at the end of the war may be taken as about 50. The State was aware of the importance of reorganisation, but happily a better way was found than before, and instead of creating a section in the Ministry of Agriculture, it was arranged for the establishment of a Central Co-operative Association which should undertake the reorganisation. In 1922 the Hungarian Central Union for Co-operative Dairy Societies was founded in the form of a co-operative society: the share capital was subscribed partly by the State, and partly by the other Central Co-operative Unions, and amounts at the present time to 3.9 million *pengős*. The co-operative societies which are attached to the Central Union are expected to subscribe shares to the value of 2 per cent. of their own share capital.

The development of the dairy co-operative societies is very satisfactory:

Number and Membership of the Co-operative Societies in affiliation with the Central Co-operative Union.

Number of societies		Membership	Number of societies		Membership
1923. . .	10	627	1928. . .	124	12,317
1925. . .	41	2,883	1929. . .	148	15,538
1927. . .	93	7,889	1930. . .	216	?

The number of the co-operative societies within and outside of the Federation at the end of 1928 was 272, representing 55,426 cows, nearly six per cent. of the whole head of cows in Hungary. This development by leaps and bounds is partially explained by the rapid and steady growth of the milk surplus. The position of the Central Union is not easy, for naturally it cannot meet every expectation as regards the foundation of a co-operative society, but only such as have in view some marketing possibility for the increased supply of milk. It also endeavours to construct or maintain on the most scientific lines possible its system of collection. It therefore abstains, for the time being, from the establishment of new societies in localities where they could only be set up at considerable cost.

The members of the different co-operative societies are pledged to deliver to their own society, payment being made monthly with an advance in the middle of the month. The purchase price is fixed by the central society and differs according to the use to which the milk is to be put. The milk sold as liquid milk is more profitable than the transformed milk. Of late years a larger surplus had to be transformed, while the price of the transformed product has dropped from year to year; hence it became necessary to make a distinction in the contract prices according to the utilisation. For delivery of fresh or liquid milk, the members received 55 per cent. of the consumers' prices, according to the position of the society on the market; this price remained constant for the whole year. For milk intended for transformation the price was considerably lower and varied from month to month in relation to the average of the prices of home and foreign produced butter.

It is thus of the first importance to the producers to know for what purpose their butter is being utilised. From this point of view the co-operative societies are divided into three groups. There are at present 40 societies whose milk reaches the consumers' market in the capital; with these 80 per cent. of the deliveries is reckoned of fresh milk and 20 per cent. of milk for transformation. There are besides three societies which have their headquarters in a large town with a high consumption of milk and which extend their activity over the supplying areas of this market. For all these societies the price is established in advance monthly, the basis taken being the ratio between the two types of utilisation in the previous month. The milk of the remaining co-operative dairies only comes into consideration as milk for transformation. The distribution of the societies between the first and the last group depends on their geographical situation; outside a certain zone fresh milk does not pay the transport costs. A certain compensation for the lower reckoning of the milk for transformation is that in such cases the whey and the skimmed milk is returned to the members without charge.

The individual co-operative societies are not obliged to make delivery unconditionally to the Central Co-operative Union; but on the other hand the Union must take all offered. Membership is open not only to co-operative societies but also to individual owners, chiefly large owners, who supply milk directly to the Central Union.

The milk turnover of the Central organisation and the dairy societies taken together amounted in 1929 to 52 million litres. Out of this quantity 20 million litres is utilised as fresh milk. The largest market for fluid milk is the capital Budapest where the central co-operative organisation has an extensive distribution system with 2,240 branch depots. Sixty of these are shops attached to consumers' co-operative societies; in this way a direct connection between producers and consumers societies is effected.

The Central Union also endeavours to assist the societies in their sales to purchasers other than itself. With this object a new development is the formation

of milk committees for the *Comitat*. These committees have a threefold function : the drawing up of agreements between the co-operative societies of the *Comitat* on the hand and the dairy enterprises on the other ; the establishment of the basic butter price on which the price paid to the societies for milk is to be calculated ; lastly conciliation and if required decision in disputed cases. On the Committee in addition to representatives of the co-operative societies, agricultural institutions, milk dealers, as well as the Central Union, are represented, and it also has power to protect the interests of individual co-operative societies.

The diffusion of dairy co-operative societies has to be brought into relation with the increase of milk production, and this again to a very important extent with the activity of the milk-testing societies. The activity of these latter societies is co-operative if not in form, undoubtedly in substance. They were in existence in pre-war Hungary, and then all disappeared, so that in 1926 it was necessary to begin all over again. At the end of 1928 there were already 63 unions with 521 dairy farms, including 19,867 cows, or 2.46 per cent. of the whole head of stock in Hungary. This is a remarkable development in two years ; and the results as regards improvement in quality are also most promising. A cow belonging to one of these testing societies, named " *Augusta* ", holds the world record for butter fat content (767 kilogrammes) and another the European record for milk production (" *Ruca* " with 14,349 kg. in 364 days). It is a satisfactory feature that the membership of small farmers is increasing more rapidly than that of the large owners.

The persisting crisis in wheat which seriously affects Hungarian agriculture has naturally resulted in more importance being attached to other products and these accordingly shew signs of giving better profit returns. It was recognised that even a partial transformation of production can only be carried through successfully if it is possible to extend the market for the more favoured products, and it was with this object that new types of co-operative marketing associations were formed.

In the first place three associations of the kind began operations with State support, one for potatoes, one for fruit and vegetables and one for onions. After two years these three were amalgamated into a single co-operative society. The object was to establish an organisation for price stabilisation, extension of markets and standardisation. The co-operative association was of centralised type, and accordingly a large scale organisation without local societies. It may perhaps have been here that the mistake was made ; either the working of the joint organisation was not sufficiently reliable, or else owing to the absence of proper contacts it could not gain the confidence of the farmer ; the fact remains that it found no adequate response in farming circles and some serious business losses brought it to a speedy end after two years.

It proved possible however to profit at least partially by the experience thus gained later when attention was turned to the solution of the problem of marketing of wine. Wine is a product of extraordinary importance in Hungary. About 5 million hectolitres represents the average yearly vintage with a population of 8.5 millions and a consumption of about 30 litres per head per annum. Accordingly half of the average vintage must be exported ; a task of some difficulty with the present high tariff and taxes on articles of luxury. Four co-operative wine selling associations were founded, one each for the principal wine districts each of which grows a wine of special type. The minimum share capital was fixed at 200,000 *pengös* per association, the State subscribing one half of the shares, and the other half being taken up by the producers concerned. In addition the State guaranteed to each association a credit of 50,000 *pengös*.

The association for the area producing the celebrated Tokay wine — where the crisis is at its worst — was particularly well equipped with capital. The shares of the growers can also be paid in wine.

The association accepts wines of good quality for treatment, but is mainly occupied with the standardisation and rendering uniform the wines of average quality supplied by the members. Quality is established on delivery according to the Malligand degrees. The association works on commission. When a certain quantity is sold, the accounts are made up with the members from whose consignments the parcel was made up. For this purpose the Malligand degrees are taken into account, that is to say that any member who has produced a wine of higher degree than the standardised wine which is the result of the mixture receives a bonus. At the time of consignment, the member receives an advance equal to 60 per cent. of the market price ruling at the time. The four co-operative wine selling associations have a total capacity of 20,000 hectolitres. As they have only been in existence for a year, it is not yet possible to form any idea of the results.

A co-operative society for organisation of the sale of hemp was also formed. It does not engage directly in marketing, but is confined generally speaking to : 1. making advances on the crop ; 2. arranging an agreement with the factories which is incorporated afterwards by the growers into their direct contracts with the factories — an activity of the type of that of the American collective bargaining associations ; and 3. supervision of the accounts of the growers with the factories. Each member binds himself to accept the agreement made between the association and the factory : the direct contractual relation is formed between the factory and producer by means of a special contract. The advances are also liquidated through the factory although by means of funds placed at the disposal of the factory by the association. In 1929 the membership was 118 and 15,500 Hungarian acres were administered by the association. The advance was 100 *pengős* for growers only producing hemp fibre and 120 *pengős* for those who also produced hemp seed.

The co-operative hop marketing association works on similar lines. Loans at the rate of 2400 *pengős* per Hungarian acre are made to members, who can keep the money at 5.5 per cent. interest so long as they grow hops. A part of the loans is supplied in goods, wire or young plants. The association is not obliged to accept the members' hops ; it receives a sample from every member, and on that basis makes offers to the breweries, and brings them and the growers into direct relation. In 1929 the membership was 99 with 400 acres cultivated in hops.

Both associations received the greater part of the capital lent from the State, in all about 2 million *pengős*.

It has proved as difficult to find a satisfactory solution for co-operative sale of fruit brandy as for fruit. Distillation of fruit residues is widely carried on in Hungary and mainly by the small farmers. This scattered form of production makes it difficult to assess or collect the alcohol tax. A fiscal enactment of 1917 ensured certain privileges to co-operative distilleries. With a view to the encouragement of the formation of co-operative distilleries a central association known as " *Fructus* " was established. The number of the co-operative societies increased fairly rapidly, but they did not succeed in attracting the farmers. The reason for this was that in the co-operative distillery fruit spirit was taxed strictly according to its content in alcohol, while in the small private stills, only that amount was taxed that could not be disguised. When however in the agricultural crisis fruit brandy began to be an item in the receipts, while the sale became constantly more difficult, a rather more favourable opinion of the importance of co-operative distilleries began to be current. It was then enacted that all co-operative distilleries were to be enrolled

in the federation "Fructus". The membership of this Central Co-operative Union rose in 1928 to 225, of these 130 were co-operative societies, the remainder being distilleries belonging to communes or distillery companies. Measures were taken for a more exact fiscal control of the stills and at the same time the tax exemption of fruit brandy distilled co-operatively was raised by 10 per cent. so as to compensate for the disadvantages of the co-operative societies. It proved however also essential to take measures for the improvement of the selling conditions. With this object a share company for the sale of fruit brandies was established with the exclusive right of selling fruit brandy. Hence a selling monopoly which was in reality intended to favour the co-operative societies. Numerous exceptions had however to be made with reference to the large number of farmers working their own stills, and in consequence the company could not establish the necessary position for itself on the market. and although in the general judgment it did succeed in introducing a certain system into the market, it was unable to fulfil its proper task, viz., that of price stabilisation. The question is at the present time awaiting fresh settlement.

The Company for trading in fruit brandies, which was in reality the central selling organisation of the Central Co-operative Union *Fructus*, sold in 1929, 48,004 hectolitres of fruit brandy; of that quantity 17,188 hl. represented sales by co-operative associations, or 35.8 per cent. of the whole sales.

There are no special co-operative societies for eggs and poultry, although for nearly a year past endeavours have been on foot with a view to bringing these products through existing organisations into co-operative trading. The dairy societies undertake eggs also, which are either sold in the milk depots of the capital or are exported.

An interesting experiment is furnished by the method followed by the rural consumers' co-operative societies. The societies receive from the Central a price limit at which they may accept poultry and eggs from members. The payment is made as the member prefers either in kind or up to 50 per cent. of the value in money. The advantage for the member is that the co-operative society covers its own costs from the retail prices of the commodities given in exchange and this it can arrange for marketing without calculation of the expenditure.

In this way, the producer may obtain 80 to 85 per cent. of the selling prices instead of the usual 45 to 50 per cent. The products bought by the co-operative societies are in part sold in the town warehouses of the Central consumers' co-operative society and partly exported. During the first ten months of this marketing three million eggs and 80,000 kg. of poultry were accepted for sale. The eggs were marked with figures and carried the Hangya mark also, so that the origin of defective eggs could be ascertained. In any case, it is an experiment of some interest in the direct purchase from the producers on the part of the consumers' co-operative societies.

VI. CO-OPERATIVE LIVESTOCK INSURANCE.

Co-operative livestock insurance societies based on the principle of mutual insurance suffered so seriously from the war that at present there are only 54 in existence. They belong to the Central Co-operative Union founded in 1898, which undertakes reinsurance, in such a way as to distribute the risks according to locality. The large co-operative farmers' insurance society founded in 1900 is still in existence. It undertakes all branches of insurance business, including livestock insurance. For this last branch the premiums paid in 1929 amounted to 310,000 pengős, the hail

insurance premiums amounted to 1,440,000 *pengős*, and those for fire insurance to 3,600,000 *pengős*.

To complete this survey it should be mentioned that the Central Consumers' Co-operative Union known as "Hangya" at the end of 1929 grouped 1,661 co-operative societies with 672,295 members in all. The turnover was 68 million *pengős* representing wholesale prices. Ninety per cent. of the members are farmers.

VII. GENERAL CONCLUSIONS.

From this brief review of Hungarian agricultural co-operation two facts emerge: while rather too much caution has been displayed in respect to new forms and new objectives, particularly as connected with marketing, the co-operative movement should none the less take an important part in the struggle against the agricultural crisis; on the other hand it is precisely this crisis which is preventing co-operation from a more striking development along new lines. The whole economic life of Hungary is so bound up with agriculture that the negative results as regards returns from the farming industry involve a disappearance of capital for the whole public economy. Industry is of small importance as compared with agriculture, and accordingly is not in a position to meet charges in favour of farming interests. The State is beginning to feel the effects of the serious situation of agriculture, and hence from year to year is obliged to exercise greater economy in making the allocations required by agriculture. The co-operative marketing societies stand in need of considerably larger funds if they are to be able to finance their selling operations. Since these funds are not obtainable by joint action of the members, nor from the State nor by means of private capital, the movement is now face to face with insuperable obstacles. That the desire exists to discover new ways is shown by isolated attempts on the part not of the small farmers but of the large land owners to organise themselves into co-operative societies for purchase and sale, on the model of American, Danish, or Dutch co-operative organisations. The striking success of one of these may well be of decisive importance for agriculture and may act as the stimulus necessary to bring those instincts for co-operation which at the present time lie dormant to their full development.

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MARKETING OF AGRICULTURAL PRODUCE

The Institute for the Export of Agricultural Products and the Board for Purchase and Export of Breadstuff Cereals and Feed Grains in Bulgaria.

INTRODUCTION.

The general aspect of Bulgarian agriculture has not greatly changed in comparison with that of pre-war times, although there was some disturbance experienced during the immediate post-war period. Cereal cultivation which before the war constituted the main source of economic wealth in Bulgaria has not, since the loss of the Dobrudja, maintained its former importance, its place in this respect having been taken by tobacco cultivation. In spite of the cession to Greece of the best tobacco

regions such as Western Thrace and Macedonia, the cultivation has much benefited from the influx from those same regions of Bulgarian refugees who have great skill and experience in tobacco-growing.

However the reduction in the areas under cereals in the first post-war years was temporary and in the last few years the area sown in cereals has already exceeded the pre-war level. Moreover as a result of the introduction of the more modern technical methods a considerable increase in average yield per hectare has been obtained in recent years, especially for wheat, which contributed to the increase in the total production of cereals. In spite of all this, cereal production cannot at the present time leave large margins for export, since in the meantime the population has increased and also the average consumption of cereals per head.

Now as formerly cereal production in Bulgaria depends largely on climatic conditions, which oblige the country to import cereals in the years of poor harvests (as happened in 1929-30 after the poor harvest of wheat in 1928-29) and leave considerable surpluses for export in the years of abundant harvest (as happened in 1930-31 after the good harvest of cereals in 1929-30).

The combination of various favourable circumstances in the first six or seven post-war years — the favourable seasons, the high prices of products whether on the home markets or abroad, the propitious combination of factors on the foreign markets, etc. — has set up conditions suitable to the larger development of oilseed products, manufacturing products, vegetables, fruit, and also of stock raising both of large animals and the smaller farm stock. Such production was soon in excess of population needs, and hence in recent years there has been a somewhat considerable margin for export. It should also be noted that the increase in the areas under cultivation of the kind indicated above was due rather to the utilisation of new lands not previously cultivated than to any reduction in the areas under cereals. In recent years however there has not been noticeable a tendency towards abandonment of cereal cultivation, which remains still the main occupation of the greater number of the farmers, who grow grain for their direct needs; this without taking into account those — about 20 per cent. — who are engaged in the cultivation of wheat for export abroad. In conclusion it may be said that Bulgarian agriculture in the first six or seven years after the war, in spite of the heavy pressure of the taxation resulting from the Peace Treaties, was passing during that period through a phase of relative economic prosperity.

The world agricultural crisis, however, has had marked influence on the progress of Bulgarian agriculture, which was not solidly organised either in regard to production or to the export of products. The consequence in Bulgaria has been a serious depression in economic life, including frequent over-production of the principal agricultural products with consequent fall in prices, difficulties in placing of commodities on foreign markets, failure in the supply of intermediate or long term credit with further aggravation of the indebtedness of the farmer, etc.

Anxiety has been felt by the Government at the turn taken by agricultural conditions, and a series of measures have been undertaken with the view of affording encouragement to agriculture and farmers. The continued fall in prices and the increasing difficulties of the sale of Bulgarian agricultural products abroad, with increasingly adverse effects on the situation of the farming class, had induced the Government to seek for new measures for reorganising and systematising the inadequate organisation of agricultural production and of export of agricultural products.

With this object it has been proposed to create an Institute for Export of Agricultural Products on the model of those already existing and recently

established in the other agricultural countries of Europe. Although the need for such an organisation has been felt for some time past, the more concrete idea was formulated for the first time in May of 1930 on the initiative of the Ministry of Agriculture of Bulgaria.

THE BOARD FOR PURCHASE OF BREADSTUFF CEREALS AND FEED GRAINS,
FOR STATE REQUIREMENTS AND FOR EXPORT.

In the meantime, actually in the second half of 1930, there was a further severe decline in cereal prices, the result of the plentiful harvest in 1929 and 1930 and of the advent of imported grain at low rates from U. S. S. R., which coincided with a particularly abundant crop of wheat and with large surpluses of maize carried over from the previous season in Bulgaria. The consequence was the fall in the prices of cereals in the country to the level of pre-war prices, forcing the Bulgarian farmer to take prices which scarcely covered production costs. Exports of cereals at that time, although in active progress, were not sufficient to exhaust the large stocks accumulated with the growers, and the result was a further fall of prices within the country. So as to be in a position to check this decline and to give further encouragement to exports, the Government decided to make direct purchases from the growers, through the Agricultural Bank, of cereals to meet the requirements of the State administration. The cereal question entirely engrossed for the time being the attention of the Government, and that of establishing the Institute for Export remained in suspense. In October 1930 the Government decided not to entrust the operations of cereal purchase to the Agricultural Bank, but instead to set up a special "Board for the Purchase of Breadstuff Cereals and Feed Grains for the Requirements of the State Administration and for Export". In consequence of this decision, a law was passed on 23 December 1930 in the Sobranje for the formation of such a Board, which has been empowered to make purchases, through the various organisations (agricultural co-operative societies, Popular Banks, exporters' associations as well as individual exporters), of breadstuff cereals and feed grains directly from the growers for the present year requirements of the State administrations, *viz.*, the army, the hospitals, the prisons, etc. These purchases are not to act as a restriction on open trading, internal or foreign, in cereals, and must be discontinued just before the new harvest. Prices paid to the farmers are higher than those quoted on foreign markets. In order not unduly to aggravate the difficult position of the Treasury, and at the same time to bring about a reduction in the indebtedness of the farmers towards the State, the Government decided to make the payments for the cereals purchased in the following way: for wheat, 50 per cent. in cash and the remainder in special warrants (printed for the purpose) which are exclusively accepted as payment of the land tax for a period not exceeding one year; for the other cereals, 25 per cent. in cash and the remainder in warrants. These documents will retain validity up to 30 September 1931. An extension of not more than four months and only in the case of absolute necessity may be granted but only by the Council of Ministers.

To guarantee the farmer against loss from any fluctuations in the value of the warrants, the Board has issued these for a value of 400 million *levas* only out of a total of three milliard *levas* representing the amount of land tax not paid up to 30 December 1930. During the period of its operations the Board may oblige owners of flour mills to purchase and mill cereals for the requirements of internal home consumption, and may also oblige all dealers in cereals and the mill owners to supply exact data on the stocks in existence on their premises or in transport.

The Administration of the Board, represented by the Director, includes the following services : offices of accountancy, control and inspection. The headquarters are at Sofia and in case of necessity there may also be constituted branches in the provinces. The Council is composed of one representative of each the following State or semi-official institutions : Ministry of Finance ; Ministry of Trade, Industry and Labour ; Ministry of Agriculture, National Bank, Agricultural Bank, Central Bank of the Co-operative Societies. Also the Chambers of Trade and Industry as well as the mercantile exchange are represented by one member, appointed by the President of the Council of Ministers. The Council of the Board with the Director, who acts as chairman, undertakes the working out and the fixing of the purchase prices of cereals, which may vary from one moment to another in accordance with the prices on the foreign markets.

At the beginning of its activity the staff of the Board included a few officials only, but in accordance with the programme drawn up by the Council of Ministers, the staff may be increased if necessary to the number of 21 persons, among whom will be eleven recruited from the different State institutions and semi-official bodies, and ten chosen from persons with special qualifications in the subject. At the beginning of its activity, the Board obtained an advance of 40 million levas from the Agricultural Bank and from the Central Bank of the Co-operative Societies. The Council of Ministers has accorded to the Board all the privileges enjoyed by the Agricultural Bank during the performance of similar operations.

It is not yet possible to give a precise idea of the activity of the Board, in view of its brief period of existence. From 15 January (the date of the beginning of its work) to 3 March 1931, it has made direct purchases from growers of 420,000 quintals of wheat, of which 80,000 have been already resold for export, and of 157,000 quintals of maize, of which 140,000 have been resold for export. The Board has purchased in all 728,000 quintals of cereals, 372,000 having been resold for export. During this period the Board has paid under this head to growers 142,000,000 levas in taxation warrants, and 105,000,000 levas in cash. The Board began to export the first ten days of February 1931 and by 20 February a total of 120,000 quintals had been exported, including 40,000 quintals of wheat, 20,000 of maize and 60,000 of feed grains. In the very short period of its activity the Board has succeeded not only in checking the continual fall in prices of exported cereals but has even been able to raise them above world parity.

THE INSTITUTE FOR EXPORT OF AGRICULTURAL PRODUCTS.

The discussion of the bill for the establishment of the Institute for Export of Agricultural Products was resumed in September 1930, as the outcome in part of the wish expressed at the Conferences of the agrarian countries of Central and Eastern Europe, and in part of the increasing difficulties in the disposal of the principal products of Bulgarian agriculture (tobacco, eggs, hides, fruit, vegetables, grapes, etc.) on foreign markets. This time the initiative was taken by the Ministry of Trade, Industry and Labour, the Minister having prepared a legislative proposal in this sense. Delay was again occasioned by the formation of the Board for the purchase of cereals which engrossed all the attention of the Government. The discussion was resumed, however, more seriously at the beginning of 1931 and on 12 February 1931 the proposal for the establishment of the Institute for Export was submitted to the examination of the *Sobranje*.

After lengthy discussion occasioned by fears for the excessive cost of this new organisation, the Chamber, in the conviction that it was highly desirable to estab-

lish this institution for the safeguarding of production and of exports of agricultural products, passed the bill in third reading on 18 February 1931. The main objects of this Institute for Export of Agricultural Products, as of all the other Institutes of the same kind already existing or recently set up in the agrarian countries of Europe, are as follows: the re-organisation and rationalisation of agricultural production and export of products, with the object of increasing export and of ensuring the most remunerative price to the Bulgarian grower.

According to Article 1 of the law, the Institute for Export is a self-governing body with headquarters at Sofia, but placed under the control of the Ministry of Trade, Industry and Labour.

Among the various purposes assigned to the Institute in the law are the following:

1. to study conditions of foreign markets, old and new, in relation to the interests of Bulgarian exportation;
2. to enquire into the economic situation in relation to the problem of exportation;
3. to supply information and to give advice to Bulgarian growers and exporters on the situation of the foreign markets to which they may wish to direct their commodities;
4. to control the quality, packing and methods of shipping Bulgarian products by means of the establishment of a national mark of exportation (Articles 19-25);
5. to carry on propaganda abroad in favour of Bulgarian products, by making arrangements for taking part in fairs and exhibitions in foreign countries, with similar action in the country itself.

The administration of the Institute for Export is composed of the following bodies: 1. A General Council formed by the Director, the deputy Director and the Secretary General, and representatives of the following economic organisations of the country, viz., two of the Ministry of Trade, Industry and Labour, two of the Ministry of Agriculture, one each of the Ministry of Finance, the Ministry of Foreign Affairs, the Agricultural Bank, the Central Bank of the Co-operative Societies, the Chamber of Commerce, the Trade Exchanges, the (projected) Chambers of Agriculture, the Union of the agricultural co-operative societies, the Union of Popular Banks, the Union of consumers' co-operative societies, and of other private Banks which take part in the financing of exportation. The chairman of this Council is either the Minister of Trade or the Director of the Institute. 2. the Sectional Committees, the number and composition of which will be fixed by the Council of Ministers in accordance with the wishes of the General Council of the Institute. 3. the Management and its own office. 4. the commercial representatives of the Institute in other countries.

Financially the Institute depends upon the "special fund for the economic improvement of Bulgaria"; on the receipts of sums paid for the right to use the national Bulgarian mark of exportation, and on the grants made by the Chambers of Commerce, the Trade Exchanges, etc.

In view of its very recent constitution there is nothing further to be said in regard to the activity of this Institute. In the development of its activity the Institute will receive the support of the Chambers of Commerce and of private initiative. Also in the field of international economic policy, this Institute will take a by no means negligible part, in view of the fact that in recent times in the agrarian countries of Central and Eastern Europe the tendency to act in concert in the sphere of exports of agricultural products has become accentuated.

In the first place the Institute will deal with all the principal agricultural pro-

ducts of Bulgaria, with the exception of cereals, which will be handled by the Board for purchase and export of cereals. For the other two important articles of Bulgarian export, namely tobacco and grapes, there is contemplated in the future the formation of special Export Institutes, in view of the economic importance and special conditions of these two products, which demand separate treatment alike in regard to production and also to exportation.

CREDIT

Activity of the 'Banco de la República Oriental del Uruguay' in 1929.

The annual report of the Bank of the Republic of Uruguay for the financial year ended 31 December 1929 is proof of the progress of this institution, notwithstanding the effects of the economic world crisis. This has affected and is affecting the countries of Latin America, in so far as they are producers of foodstuffs and raw materials. This appears in the economic situation of Uruguay from the balance of trade on which there is a deficit of 20 million *pesos*, and from the price depression.

The whole report shows that the correction of the excessive consumption, which began towards the middle of 1929, has not been sufficient to re-establish equilibrium on the balance of trade or to preserve the national money from a fall which amounts to 20 per cent. below par.

The Bank, which is in charge of the protection of the currency within the limits of its legal and juridical structure and of its function as distributor of credit, has obtained, by reform of its constitution, wider powers of protection of the exchange and of control of superfluous or excessive imports, and has succeeded in decidedly reducing the serious character of the consequences. It co-operated with the Government in placing on the market a loan in defence of the *peso* at 6 per cent. at the price of 95.02 and in preparing a scheme of economics in public and private expenditure. At the same time efforts were made to develop the economic possibilities of the country, beginning with those connected with the meat market, on which it has been possible to realise higher prices than in the previous year.

The statistical indices of the activity of the Bank showed an increase in 1929 of 23 million *pesos* in deposit, and an increase of more than 11 million in the assets. On the profit and loss account there is shown an increase in losses and expenditure, to the total of 1,250,000 *pesos*, as compared with the results of the balance sheet of the previous year.

Coming to the subject of the service of agricultural mortgage credit, the report states that the policy of the Bank was directed towards elimination of the difficulties of the position of the growers due to the general crisis, and consequently towards a manœuvring of the credit in such a way that this should become a source of new producing forces instead of a means of dispersal of the national wealth in unproductive expenditure.

The total number of rural loans was 6,204 out of 6,387 operations, or an average of 839.12 *pesos* per loan.

In regard to the higher guarantees of real property that the Bank is expected to demand in the case of social or industrial investments, account is mainly taken

(1) For the development of the operations of the Bank during 1928 see: *International Review of Agriculture*, August 1930.

of the personal credit of the borrowers, which is ascertained by the most strict technical enquiries. These make possible the due appreciation of the moral conditions of the producer and his industrial capacities, whether the guarantee of real property in pledge or by mortgage is or is not supplied.

In addition there is a stronger tendency in the concession of loans to take into account the economic value of the improvements and of all that constitutes the work of intensification of cultivation.

Thus small loans guaranteed by pledge or mortgage are granted more freely and on the bases of reports made by the technical inspection service.

The report of the Bank shows that regularity in payment of the amortisation instalments and of interest is the best proof of the adaptation of the credit to the present economic conditions, and is sufficient to justify the proposal to develop still more widely rural and industrial credit on the basis of this system of ascertainment of the personal credit of applicants for loans. The result will be the attainment of more productive employment and the securing of a real advantage for the national economy.

Operations on pledge of agricultural products for a total of 944,192,29 pesos are the form of personal and real credit most practicable for the stockbreeders — a hardworking class — who transfer their pledge accounts, as if they were current accounts, without experiencing any inconveniences in their operations of transfer and sale of the animals so pledged. The pledge is in practice regulated by a proportionate amortisation. The 554 mortgage loans, granted on a value of 1,613,510 pesos, with an average of 2,912.47 pesos per operation, for a period of from one to 10 years, are made under condition of taking up the small rural mortgage for the installation of permanent improvements, the restocking of farms, the purchase of portions of estates, and for rural building of all kinds.

There is a no less steady development of loans for farm working credit in the form of bills discounted, up to a total number of 5,487. Advances of seed were also numerous, together with loans for the purchase of seeds, breeding animals and machines, and in addition loans for purchase of apparatus for co-operative dairying or for purchase of holdings on a co-operative basis; also loans with guarantee of cereals in deposit.

E. F.

Banco de la República Oriental Uruguay. Memoria y Balance General correspondiente al ejercicio terminado en 31 de diciembre de 1929.

FARM ECONOMICS

The Silk Industry in Chile.

A report prepared by a Committee specially appointed to enquire into the possibility of developing the silk industry in Chili has been presented to the Management Council of the National Society of Agriculture.

In the course of the nine chapters of this reports a study is made of the origin, history and statistics of the silk industry throughout the world, taking as point of departure the silk worm and the white mulberry. In the last chapters an account is given of the various attempts to introduce this industry into Chile which were at-

tended always by considerable difficulty, and the following general lines are suggested for successful organisation :

(a) the silk industry should be based on an effective organisation capable of distributing the required quantity of silkworm seed, of arranging for any necessary increase in the planting of mulberry trees, and of giving the technical instructions required ;

(b) the work of breeding must be mainly done by farmers, but if a standard product of high quality is to be obtained, it is essential to have a qualified staff fully acquainted with the use of special apparatus ;

(c) the production of the cocoons should be obtained, as work of a special character performed in leisure time, by the staff undertaking it ;

(d) to ensure the stability of the industry it is especially necessary that all silkworm seed should be healthy and that it should be distributed only to farmers and competent persons over whom the State can exercise a certain control ;

(e) it will be advisable not to erect costly establishments until the industry is well diffused and initiated on a sound basis.

The Committee already referred to has formulated, as the result of its enquiries, and in accordance with these principles, the following conclusions :

1. The agricultural and climatic conditions of Chile render the country well suited to the cultivation of the mulberry tree and the development of the silkworm. In addition, in view of the present utilisation in Chile of silk products, the silk industry should undoubtedly be successfully established ;

2. It is in the first place advisable that the Government would consult with a technician capable of drawing up the programme necessary for the installation and development of the industry. The direction should be entrusted to a central organisation which will undertake the selection of mulberry trees and their plantation, as well as with the selection of silkworm seed to be distributed gratuitously to those concerned. Inspectors working under this organisation and visiting the houses of the persons engaged in the breeding are to satisfy themselves that the work is carried out in full accordance with the strictest hygienic principles.

Since the industry is essentially domestic in character, the production of the cocoons should be carried out under the direction of the staffs of the rural schools and the Schools of Agriculture, who have previously received instruction in this respect.

The utilisation of the apparatus will be under the control of the same organisation.

As soon as the success of the industry is secured, a share Company will be formed in which the State will be shareholder to an amount in proportion to the commercial value assigned to the machines and to the other material which has been in the hands of the Central Organisation.

The report concludes by stating that by the establishment of this important industry in Chile, which can be developed with comparative ease, work of no great difficulty will be provided for thousands of humble families to whom the silkworm seed will be distributed free of charge and who will receive a remunerative price for cocoons.

E. F.

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STRAKOSCH: *Das Agrarproblem im Neuen Europa*, Berlin, 1930. Paul Parey, S. 400.

[The distinctive feature of this work is not merely the fact that it deals in detail with a number of problems, but that it also indicates the connection of these with agricultural policy taken as a whole and the connection of this latter with the so-called "economic coefficients" of any one State.

The central problem of post-war agriculture, the discrepancy between costs of production and the prices of agricultural products, the diminished earning capacity of the farm, is handled in detail and in all its aspects. A somewhat lengthy discussion of European agriculture in the XIXth century, the true background from the economic and social standpoint, forms here the basis of the further illuminating investigation of modern agricultural problems. The agrarian reforms carried out in Europe after the war, the transformation of the conditions of agriculture and all the accompanying phenomena are here directly ascribed to the appearance of the economic "price-scissors", and to the maladjustment between the prices of industrial and agricultural products. The newly formed small holdings are in the writer's opinion not large enough to provide a livelihood. On the other hand he has a predilection for the large farm, and lays stress on the part it plays alike from the technical, the economic and the political standpoint. "There are many reasons" says the writer, "why the hopes of a demographic and economic nature placed on the agrarian reform in its present shape may be all too confident" (145). The writer is however well aware that there is no size group of farms "which is in all circumstances and in every respect superior to any other" (142). Possibly the light and shade in the picture drawn by Strakosch are not quite in due proportion, but it is well known that only science and mathematics can remain entirely free from subjectivism.

Considerable space is given to the questions which are at the present time in the forefront of public discussion, for example, the introduction of agricultural duties, and the cereal monopolies. His earlier attitude towards these solutions was favourable but now, like Sering in this respect, on the whole he rejects them. In regard to questions of agricultural credit, of co-operation of the different national and international organisations for the promotion of agricultural interests, much is said of value. In respect to overseas competition, the author is of the opinion that this is not the cause of, but only the final impulse given to the European agricultural crisis. "That which stands behind the European agricultural crisis will not so easily be removed, even though the overseas cereal production will probably soon adapt itself to a need now as it were strangled. There are the many anxieties and maladjustments of a development which is not yet completed. There is the indecisive contest that goes on between systems and parties, the reshaping of a new political, economic and social world. The satisfactory settlement of the crisis does not depend on the American prices of wheat, but on the nature of the solution which will put an end to the chaos in Europe" (309-391). For this solution much valuable stimulus may be gained both by the statesman and the economist from the study of this representative and distinctive work].

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[In the light of results obtained on their farms by the tenant farmers of Soissonnais, in the course of the last five accounting years, the writer studies the critical situation of agriculture in Soissonnais. He bases his enquiry on a commercial accountancy, and the profit established is the gross surplus over the farming expenses of the receipts grouped under three heads with the figures for wheat and beetroot which form the essential elements of the farming system, and with a single figure, representing a fourth of the whole, for the receipts from miscellaneous sources.

In the second part, there is a discussion of the various ways of surmounting the crisis by reduction of expenditure, improvement of returns, calculation of net costs and so on.

In the third part the author treats briefly the question of the high cost of living, overproduction, social progress, the unduly high rate of interest on agricultural credit, and concludes by saying that these are subjects on which the growers should provide the Government with detailed information].

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MONTHLY BULLETIN

OF

AGRICULTURAL ECONOMICS AND SOCIOLOGY

MARKETING OF AGRICULTURAL PRODUCE

The Economic Relations between Europe and the United States in the Sphere of Agriculture.

(SUMMARY of the contribution to the comparative study of European and North American economy presented by Senator G. DE MICHELIS, President of the International Institute of Agriculture, Rome, to the Congress of the International Chamber of Commerce at Washington, 4 to 9 May, 1931).

For an effective collaboration between the countries of Europe and the United States to be possible, a high degree of knowledge and mutual understanding is essential on both sides. Among the problems which demand study, that of the improvement of the conditions of agriculture is one of the most important. In this article it is proposed to outline briefly the main features of the situation and to indicate certain provisional conclusions in respect to the economic relations between Europe and the United States.

As certain problems have arisen as the outcome of a somewhat prolonged historic evolution, it is essential to give a brief survey of the development of agriculture during the half-century which preceded the war, at which time certain tendencies had already made their appearance.

The period from about 1870 to the end of last century may be characterised as that of the formation of a world economy. Under the influence of the progress in transport and means of communication the different national economies, previously in a large measure isolated, had become co-ordinated into a system embracing the whole of the civilised world. Stimulated by the progress of industrial technique, production also assumed new forms; industry and trade on a large scale and capitalised, adapted to the needs of the world market, began to be built up. As regards agriculture the consequence of this development was the appearance on the European market of large quantities of American products, and somewhat later, also of products of the Southern Hemisphere. The fall in prices caused by this competition, as well as by the changes in the value of money, and the economic disturbances inevitable during a period of such profound changes in the economic system of the world, brought about a prolonged agricultural crisis, which lasted in Europe from about 1875 to the end of the XIXth Century. This crisis had resulted in changes in the organisation of agriculture, which have been particularly pronounced in Great Britain as a free-trade country. In the Continental countries the necessity for protecting national agriculture impelled the Governments to the development of a system of tariffs as a measure of defence against the threatened competition.

Towards the end of the XIXth century a state of equilibrium was reached, the transformation of the economic system on the world basis having been accomplished, and as economic activity was more highly developed than ever, the agricultural situation had changed for the better. The industrialisation and urbanisation of the civilised world were opening new markets for agriculture, while certain of the countries which were exporters of agricultural products were reducing their exports on account of the growth of their manufacturing industries and of their home markets. This was happening in Russia and also in the United States. On the other hand there was noticeable on the world market an increase in the exports from Canada, Argentina and Australia. The civilised world in fact, on the eve of the war, was at the maximum of its output. Under the system of world economy, which was adapted to national requirements by moderate protectionist policy in each case, free circulation of capital and of products was possible, and it may be added also of producers who could change their place of residence as suited them and take up employment wherever a maximum output could be ensured. Prices of agricultural products were high and the agricultural situation was generally favourable.

The equilibrium which had been established at the beginning of the century was destroyed by the war. The war not merely disorganised the world economy in general, but, by removing Russia from the market, stimulated the increase in the overseas production. At the end of the war, not only was there a reconstruction of European agriculture, but the new overseas countries, for the most part given up to single crop farming, could not reduce their sown areas and in fact continued to extend them. The increase in the production of cereals, and particularly of wheat, side by side with a modification in the demand due to a diminution in the consumption of cereals in the principal importing countries, resulted in a decline in prices which became more and more pronounced. Under the pressure of the cereal crisis the farmers inevitably began to develop other branches of production, such as dairying, stock breeding, market gardening, etc. From the fact however that demand for the products of these branches of farming is more elastic than the demand for cereals, and also because the post-war economic situation was characterised by a profound depression and diminished purchasing power on the part of the public, it soon became clear that absorption of products was only possible at prices which steadily declined. The crisis thus became generalised and affected agriculture as a whole. In the course of recent years, in fact, the fall of prices on the market was more or less universal and more or less sustained. The position of the agricultural industry in the world, on the other hand, was aggravated by the fact that the costs of production, and in particular the charges resulting from social and fiscal legislation, mortgage liabilities and wages did not fall in any measure corresponding to the fall in the price of products. The efforts made to diminish costs by means of the processes known under the name of rationalisation of agriculture, although bringing some relief, do not afford a solution of the problem since no checking of the decline in prices seems to be possible.

On the other hand, in Europe, the rationalisation of agriculture cannot be applied beyond certain limits without producing social effects. Neither measures of agricultural protection, a policy now pushed to the extreme, nor rationalisation seem to offer a solution of the problem of the crisis.

The characteristic feature of the present crisis, and the one in which it differs profoundly from the crisis of the XIXth century, is, in the first place, the incapacity of the market to absorb at remunerative prices the products offered. The causes of the crisis are to be found in the demand, which is much diminished by the

return to economic individualism. This phenomenon which is markedly on the increase is tending to destroy all that was accomplished on the eve of war in the way of fusion of national economies into a vast organisation of world economy. In place of a system that enables capital, products and producers themselves to migrate from country to country under conditions of almost complete liberty, thus ensuring a maximum output to such system, we are at present living under conditions in which this liberty is hampered by all kinds of artificial barriers. The producing forces are compelled to remain in the localities and under conditions where their output is less than it might be if transfer were possible. From this point of view the agricultural crisis takes the form of a factor in the general economic situation governed by an individualism tending to destroy the essential bonds of the world economy. A radical solution of the problem appears only to be possible through a return to the essential principles which serve as the basis of the world economy. A detailed examination of the different obstacles to the development of economic relations between Europe and the United States would not be possible in this article, but those of most importance may be mentioned. In the first place in the United States as in the other countries of the New World, the problem is one of emigration, as the means of effecting a better distribution of the population of the globe, on the one hand, and on the other of developing the resources and the home markets of the countries of colonisation. In the second place, stress must be laid on requirements in capital, the abundance of which was one of the most important factors in the agricultural prosperity of the pre-war period. Importance also attaches to the remedying of the situation created in consequence of fiscal charges which are the result of the heavy debts that the European countries have to pay to other countries since the war, the burden of which makes difficult the return to sound economic conditions. The present distribution of gold in the world, which is to a great extent responsible for the present economic distress, is also one of the effects of post-war indebtedness of Europe. There can be no doubt that on the solution of the problem of these debts depends the salvation of all the countries of the civilised world, rich or poor.

Organisation of the Trade in Argentine Fruit.

The trade in Argentine fruit is undergoing organisation by dealers and growers by means of a *Bolsa Nacional de Fruta*, which is to function at Buenos Aires, and by a trading company, established at Mendoza.

The purpose of this organisation is the improvement of the quality of the product, increased production and reduction of cost ; a reduction which should give a great impetus to the national market and to foreign sales, and would eliminate the influence of the intermediaries, who are grouped in strong trusts.

The so-called *Bolsa Nacional de Fruta* will be a central market with refrigerating plant, undertaking storage of products. This will enable the Government to collect revenue both on imported and on exported products.

The refrigerating plant in private ownership will with this object be replaced by that of the Ministry of Agriculture, with a view to obtaining, in addition to a complete system of supervision, an appreciable saving of expense.

Sales will be made daily by public auction and the prices obtained will be a matter of general knowledge.

The scheme includes regulations for the working of the central market, the methods of sale, payments, profits, etc.

The following are the objects of the *Sociedad Fruticola Comercial de Mendoza*, established on 14 July 1930 :

(a) the sale of the fruit and vegetable products of the members, and of products purchased by other growers, whether on the home or on the foreign market ;
 (b) purchase by the association, on members' account, of machines, implements, building materials, seeds, containers, disinfectants, packing materials, etc., as well as everything essential to their plants and their means of production ;
 (c) granting of credit to members on favourable conditions, employing the funds set aside for that purpose ;

(d) formation of the Hail Insurance Section for the benefit of members ;
 (e) construction of a refrigerating plant for conservation of products and regulation of consignments to the consuming markets ;

This plant is at the service of members, and if its capacity allows, it will be utilised also for other products, the railway from Buenos Aires to the Pacific being interested in its establishment.

(f) institution of a school for instruction in packing, handling and trading in fruit, vegetables, etc., as well as of a packing house which will supply containers standardised for export ;

(g) construction of dessiccators and warehouses for collection of products in those localities in the province of Mendoza, where it is necessary to concentrate partial consignments of fruit, vegetables and their derivatives ;

(h) establishment of regional factories for the manufacture of fruit preserves ;

(i) construction of special stoves for drying of fruit and vegetables and formation of standard types of products for sale on home and foreign markets, a single mark to be adopted with a stamp ensuring quality and place of origin ;

(j) negotiation for obtaining special freight rates from the railway and shipping companies ; representations to the Government asking that endeavours be made to secure reduction of taxes and customs duties on Argentine fruit and its derivatives, as existing in the purchasing countries ;

(k) encouragement of a scheme for demonstration trains to run yearly carrying plants and trees in fruit, the object being to make known the different most suitable kinds of fruit, to recommend the varieties adapted to each zone, to reduce prices, and to control the health conditions of plants, etc.

Attached to the company is a qualified staff competent to diffuse among growers the main principles in regard to plantation. A permanent propaganda is being carried on in Argentina and abroad, competitions and exhibitions are being organised in the province, and national prizes arranged.

The provincial Government is being urged to make regulations for the proper working of the experiment fields and nurseries which have special reference to fruit-growing, and strict observance is required of the rules in force on the subject of compulsory disinfection, and those relating to the diseases of fruit trees.

Finally application is being made for a special law to establish a premium for this company, in compensation for risks of invested capital.

The initial capital of the Company is one million pesos (national money), divided into 10,000 shares of 100 pesos each.

This capital may be increased serially by 500,000 pesos, in accordance with the requirements of the Company.

E. F.

CO-OPERATION

Agricultural Co-operation in Czechoslovakia.

A. ORIGIN, DEVELOPMENT AND PRESENT POSITION OF THE CO-OPERATIVE MOVEMENT IN CZECHOSLOVAKIA.

If an exact idea of the present position of agricultural co-operation in Czechoslovakia is to be formed, it is essential not to lose sight of the fact that the co-operative movement originated and developed in each one of the provinces which make up Czechoslovakia, under special political, economic, social and national conditions in each case. Before the war, the provinces of Bohemia, Moravia and Silesia were regarded as three jewels in the crown of Bohemia, which led to their designation as "historic countries"; these provinces were under the domination of Austria, while Slovakia and Ruthenia were united to Hungary. It is obvious that the legislative and juridical differences between Austria and Hungary must exercise a strong influence on the whole of the economic and social life of these two ancient States and consequently on the co-operative efforts. It must be remembered that in the "historic countries" the Czech people attained at the end of the XIXth century a relatively high degree of culture and economic prosperity, higher than that reached by the Slovaks and Ruthenes. The national minorities also contain special elements. The following figures will serve to illustrate in the main the importance of the different provinces and of the national groups making up the State as a whole.

Province	Area in sq. km.	Number of inhabitants (1930 census)	Census 1921 Ethnographic distribution of the agricultural population in Czechoslovakia		
			Nationality	Figures in thousands	in %
Bohemia	52,034	7,107	Czechoslovakian	3,595	66.71
Moravia	22,315	3,563	Ruthenian	398	7.19
Silesia	4,423	—	German	852	15.81
Historic countries	78,802	10,670	Hungarian	456	8.46
Slovakia	48,936	3,331	Polish	16	0.30
Ruthenia	12,656	725	Any other	44	0.82
Slovakia and Ruthenia	61,592	4,056	Foreign	38	0.71
Czechoslovakia	140,394	14,726	Total	5,389	100.00
			Including	2,315 Czech	42.96 Czech

The special features of the different provinces and national groups as reflected in the origins and character of the Czechoslovakian co-operative movement explain the formation of the Central Unions of which more will be said later.

It was in the historic countries, and in particular in Bohemia, that the co-operative idea met with a cordial recognition among the peasant classes that hastened its realisation in fact. It was reserved for Francis Kampelík, doctor of medicine, to be the first Czech promoter of the movement. In the years from 1850 to 1860 he continued to urge the formation of co-operative credit societies and carried on an energetic work of propaganda with this object. It was however not till 1890, at the time when farmers were suffering from the consequences of the fall in prices of agricultural products that the first credit society of the Raiffeisen type was established. These organisations, which were called "Kampeličky" after the first apostle of the Czech co-operative movement, attained such a diffusion that a quarter of a century later they covered nearly the whole of the country. The first German society of

the Raiffeisen type had already been formed in 1886 in the historic countries. An even greater impulse was given by the Germans than by the Czechs to these banks, the organisations of other types of agricultural financing institutions not being so fully developed with the Germans as with the Czechs. After their formation the Raiffeisen banks were not slow to deal with joint purchase of agricultural requisites, as well as questions of credit. Later other questions came to be handled by co-operative activity, and special co-operative societies for purchase, sale, utilisation of agricultural commodities and products, farm machine and electric supply societies, etc., came into existence. The societies became grouped into provincial and national unions which centralised their activity. Twenty years after the foundation of the first co-operative credit societies, the co-operative movement in the historic countries had shown very remarkable results. In 1910 the agricultural population of these countries represented only 25 per cent. of the total number of that of former Austria, while the number of Raiffeisen societies was 44.4 per cent. and that of the other agricultural co-operative societies was 35.1 per cent. of the total number in the whole of Austria. It was estimated that out of 5 Czech farmers, three were directly interested in the progress of co-operative societies. The development in the historic countries during the pre-war period of the co-operative societies is shown by the following figures:

Year	Number of co-operative societies affiliated to Federations				Share capital (thousand crowns)		Deposits (thousand crowns)		Turnover (thousand crowns)	
	Kampeličky		Raiffeisen		Others					
	Czech	German	Czech	German	Czech	German	Czech	German	Czech	German
1903	1,084	815	812	96	128	80	10,682	14,130	110,634	101,141
1911	2,404	1,073	1,150	283	1,029	130	51,603	47,873	682,172	211,236

The Slovak and Ruthenian peasants lived before the war under conditions wholly different from those of Czech peasants. Hence the idea of co-operation was bound to be more coldly received in those provinces than in the historic countries where the peasants had full opportunities for founding, organising and administering co-operative societies. In Slovakia and in Ruthenia, on the other hand, the co-operative movement depended directly on the government which exercised a decisive influence not merely on the formation of new societies but also, by the intervention of officials, on their activity. In fact before the war there were no co-operative societies of national character in these regions. There were merely a certain number of consumers' and credit societies, due to Government initiative, the majority being affiliated to the central society "Hangya" at Budapest.

The revival of the State of Czechoslovakia increased the possibilities of action for the agricultural co-operative societies in all the provinces that composed it. Owing to the solidity with which they had been founded the co-operative societies of the historic countries were able to surmount the difficulties of the period of hostilities, during which, it is true, many of them ceased working for a time, while others were able to maintain themselves by adapting their activity to the exceptional circumstances. The co-operative warehousing societies took part, in the capacity of official commissioners, in the provisioning of the population. In spite of all the material losses suffered from the war, the societies were very soon able to resume normal activity. One problem of first importance, among many others, presented itself for solution: the formation of a systematic bond among the different Unions, to co-

ordinate their activity so as to form an effective co-operative system with joint and several liability over the whole territory of the new State. At the same time the co-operative societies of Slovakia and of Ruthenia cut the bonds which linked them to their former centre at Budapest and grouped themselves into Unions. The central organisation dates from 1921 ; the new Unions of Slovakia, and of Ruthenia, from 1919, 1920, and 1924.

Agricultural co-operation plays in Czechoslovakia of to-day a part of the first importance not only in agricultural life, but in the national economy of the country as a whole. The spirit which animates the movement and its activity, which goes far beyond purely economic limits, exercise a moral influence on the agricultural classes, and thus contribute to the raising of the general intellectual level and to the progress of agriculture generally. It is quite natural that this should be so, since co-operation has been built up by those sections of the rural population which have devoted their energies to fostering it and have supported it with their own financial means. The principle of mutual aid is at the basis of the co-operative movement of Czechoslovakia.

On 31 December 1930, there were in Czechoslovakia 11,029 agricultural co-operative societies, grouped in 12 Federations, which in their turn form part of the central organisation at Prague. The most numerous and the most completely organised are the co-operative credit societies, to the number of 5,853, including 5,200 with unlimited liability of the Raiffeisen type, which remain the buttress of Czechoslovakian agricultural co-operation. As regards organisation and working, there should be noted as coming next the co-operative societies for purchase and sale, the activity of which up to the present is confined rather to the purchase of farm requisites than to the sale of agricultural products. Remarkable results are also to be attributed to the co-operative societies for production although they still leave a vast field of activity to be covered. Among these societies, special mention should be made of the dairies, the development of which is especially marked in Moravia, and also of the milling and baking societies, distilleries and starch factories. The co-operative activity of the chicory drying societies, which function admirably, is especially interesting and original.

Although Czechoslovakia takes its place among the first sugar producers on the world market, and although it exports barley and hops of which the quality is renowned, both these branches of activity lie outside the agricultural co-operative activity. The sugar industry in Czechoslovakia is in the hands of capitalist companies ; the number of shares held by farmers is relatively too small. The Moravian growers alone have succeeded, as the result of a well planned and well carried out policy, in getting into their hands the majority of the shares of some sugar factories and in building new factories. In this case even the undertakings although in the hands of the growers have no real co-operative character. The division of the profits is made according to the number of shares held and not by the quantities of sugarbeet delivered. A powerful syndical organisation of sugar beet growers protects the growers' interests against the capitalist companies. This organisation, known as the "Československá jednota řepářů" which is recognised by all the sugar factories, arranges the collective agreements between the factories and the growers. Except for two co-operative breweries in Bohemia of less importance and some well organised co-operative malteries in Moravia, agricultural co-operation has not as yet covered brewing which is one of the oldest Czech industries. The growers however exercise a certain influence over this branch through their co-operative societies for sale of cereals and through the vocational organisation of hop growers.

Of the other groups, the co-operative societies for electric supply call for special mention. In this sphere, Czechoslovakian agricultural co-operation has accomplished, in collaboration with public institutions, a truly great work ; and it is in virtue of this activity, that electric power will shortly be, at least in the historic countries, available for Czechoslovakian farmers even in the most remote districts.

Agricultural co-operation in Czechoslovakia, which is faithfully represented and wisely guided by its supreme organisation, is reaching a high stage of efficiency. Among the more pressing questions still to be settled are : the definitive establishment of the juridical bases of credit associations, the strict application of the principle of rationalisation in the management of co-operative societies, the improvement and centralisation of co-operative marketing. As regards this last, remarkable results have been obtained in the sale of live stock. A farming society for the sale of live stock has recently been formed on co-operative principles, with headquarters at Prague ; and from the interest displayed by breeders and from the satisfactory number of animals already sold, there seems reason to anticipate that co-operative methods will soon make good also in this branch which up to the present has been almost entirely at the mercy of the middleman.

Since the agrarian reform to which the agricultural co-operative societies made a large financial contribution, the greater part of the land has been in the hands of the cultivators of small and medium-sized holdings. The absolutely sincere collaboration of all is the essential condition of the economic prosperity of each one of these. The Czechoslovakian peasant farmer knows this well and he will the more readily and willingly give his support to co-operation since he does not seek in it merely the satisfaction of his material needs but also the realisation of his ideal of social peace. Hence agricultural co-operation is destined to complete the work of the agrarian reform in Czechoslovakia, and to ensure its future.

B. LEGAL BASES.

The juridical bases of the co-operative societies of Czechoslovakia are constituted by special laws, including two which are fundamental : the Austrian law of 9 April 1873 for the historic countries, and the Hungarian trade law of 1875 for Slovakia and Ruthenia. The Austrian law follows the lines of the German law of 1869, but differs from it in certain points, particularly by the clause which recognises not only co-operative societies with unlimited liability but also those with limited liability. By the terms of the law, the three following fundamental conditions are required for the foundation of a society : 1. the fixing of the name of the society so as to include an indication of its object and the nature of its liability ; 2. the drawing up of the rules ; 3. the registration of the rules in the Trade Register.

To found a co-operative society no preliminary administrative authorisation is necessary. Full liberty is left by the law to the co-operative movement. Members of the society are bound by the rules to subscribe shares, to guarantee the owned capital, and to purchase from the society all requisites, as well as to sell their products to it. The dividend resulting from the profit does not as a rule exceed 5 per cent. ; the remainder is partly allocated to the reserve fund and partly distributed amongst the members as a bonus proportionate to the quantities supplied or consumed by them. The general meeting and a management council, the activity of which is frequently controlled by a supervisory council, are the organs of the society. In principle each member must hold at least one share and have one vote at the general meeting, and this is nearly always the case in the co-operative credit societies and the consumers' societies. In the other classes of co-operative societies, the question

of the right of voting is settled on somewhat different lines. The financial resources are derived from the issue of shares, from the collection of entrance or registration fees, and from credit; to obtain credit, the society usually applies to its financial centre. The number of shares to be paid by each member is fixed by the rules in proportion to the value of the services that the society can render to each. The shares usually range from 10 to 300 Czechoslovak crowns. The societies are expected to prepare a balance sheet every year. Members of the two Councils are legally liable for losses incurred by the society owing to their neglect of duty. The society can be dissolved by a simple majority vote of the general meeting, and is dissolved in the event of bankruptcy or if it is so ordered by the State authorities. This last case will arise only if the society exceeds the limits of its activity in contravention of the law. Another important law is that of 10 June 1903 which introduced obligatory inspection of co-operative societies. All unions are expected to proceed every two years to the inspection of their affiliated societies. Unions in the provinces detached from the old Kingdom of Hungary are however under the terms of a special law obliged to carry out this inspection every year. This inspection is rather of an educative character than in any way of the nature of a police measure. The provisions of the Hungarian law of 1875 do not greatly differ from those of the Austrian law of 1873. Another law, relating to co-operative credit societies, was passed in Hungary in 1898. In virtue of this law, a co-operative credit society could only be founded with the direct collaboration of the administration or that of the credit centre. After the Czechoslovak State was formed, it was necessary to regulate without delay the relations existing between the co-operative societies of Slovakia and Ruthenia and their former centre in Budapest. For this purpose, a special law was passed in 1919 to effect the necessary measures which were imposed by the new situation. It was in particular prescribed by the law that these societies must cease to belong to the central organisation at Budapest, and that they must join the new central organisations to be founded. In addition legal control was introduced which had not been in existence in Hungary. The Czechoslovak laws of 1924 introduced important modifications into the administration and control of the co-operative societies of the Raiffeisen type (the Kampelík credit associations). Under these laws, these establishments can accept deposits on pass-books provided there is affiliation with one of the Unions exercising legal control. By another provision these laws limit trading operations by these societies to the supply of commodities to their members. As a consequence of this last measure, co-operative federations, which up to that time were acting also as trading centres, have had to discontinue this activity; to this fact was due the coming into existence of the new co-operative central unions.

Czechoslovak legislation contains a series of other laws relating to the different branches of co-operation, and granting fiscal privileges to the co-operative societies. Particularly interesting is the text of the law of 15 June 1927 which deals with the special tax on the net profit. By the terms of this law, societies which either by their rules or in fact limit their activity to their members pay annually only 2 per thousand of their share capital. The other co-operative societies are subjected to a tax calculated on the following basis: two per cent. is collected on the first 20,000 Czechoslovak crowns of net profit, 3 per cent. on the next 30,000 crowns, 4 per cent. on the next 50,000 crowns and 5 per cent. from 100,000 crowns onwards. These societies must, in addition, pay a supplementary tax on the profit.

A special Committee constituted within the State Economic Council is preparing a new legislative proposal relating to the right of inspection and control.

C. CENTRAL UNIONS AND FEDERATIONS OF THE AGRICULTURAL CO-OPERATIVE SOCIETIES.

Once the first co-operative societies were formed, the necessity for common central services very quickly made itself felt. Federations were set up, but their organisation did not correspond to the different groupings of the varying types of societies as they are usually grouped in other countries, but only to the territorial, national and even political conditions. In the historic countries, there were eight Unions in existence before the war, the oldest dating from 1893. After the war, there were added to these two Unions in Slovakia (founded in 1919 and in 1924), a Polish Union at Cesky Tesin in 1920, and one in Ruthenia in 1920, so that Czechoslovakia has at the present time 12 agricultural co-operative Federations. The distribution of these is as follows, the number of co-operative societies belonging to each Federation being shown in brackets: two Czech Federations (3,756 and 486 respectively) and one German (1,217) in Bohemia; two Czech (1,205 and 777 respectively) and one German (663) in Moravia; one Czech (218), one German (197) and one Polish (83) in Silesia, two in Slovakia (1,982 taking the two together), and one Federation in Ruthenia (435).

The financial capacity of these Federations is reflected in the following figures (in thousands of Czech crowns):

Federations	Number of affiliated societies 1930	Owned capital	Members' deposits 1922	Balance sheet total (apart from deposits)
Czech	6,442	137,521	1,255,630	2,378,874
Including those in the Central Union at Prague . . .	3,756	120,234	886,554	1,660,325
German	2,082	9,887	319,817	485,883
Polish	88	176	4,168	5,701
In Slovakia and Ruthenia . .	2,417	6,575	45,538	90,554
Czechoslovakia	11,029	154,159	1,625,253	2,961,072

The most powerful and the best organised is the *Ustřední Jednota hospodářských družstev* (Central Union of agricultural co-operative societies) at Prague. The following figures illustrate its development from its origin up to recent times, which gives some idea of the vigorous growth of the co-operative idea in Czechoslovak agriculture (in Czech crowns):

Year	Shares	Owned capital	Deposits made	Total turnover
1897	2,260	10,233	69,688	593,031
1907	85,920	23,270	18,932,870	139,056,452
1917	521,100	732,168	150,483,415	692,150,249
1927	8,706,000	100,667,057	1,166,809,864	16,415,695,344
1929	10,004,000	110,930,281	1,234,316,677	20,572,055,869

The Federations are organised on the basis of the law on the co-operative societies. The administrative bodies, apart from the management which is the executive organ, are 1. the General meeting, 2. the Committee, 3. the Supervisory Council and 4. the Management Council. The Federations fulfil the rôle of central organising and advisory bodies, and, except one Federation in Slovakia, also that of a financing body. By the law of 1903 the execution of the legal inspection of the co-operative societies was entrusted to these Federations, and this type of activity, which is exercised by an inspection bureau attached to each Federation, has become one of the most important functions of the Federations. The qualifications of the inspectors are clear from the thorough instruction they have received and from the examinations which they have to pass before being admitted to the services of the Federations. They carry out, in addition to the general legal inspection for each period of two years, several partial inspections, and do much to strengthen the confidence of the farmers in respect of the co-operative institutions. Very often, especially in the co-operative credit societies of Raiffeisen type, the legal inspection is made every year. The trading activity of the co-operative societies is also controlled by means of special inspections on the commercial side. Special attention has always been given to the question of inspection by the administrative elements in the co-operative movement. It is proposed to fill certain gaps which remain in the legislation on the subject by means of a new law on inspection dealing with the co-ordination of the legislative prescriptions existing, and the adaptation of the process of inspection to the growing importance of the co-operative credit societies, especially by the introduction of a compulsory inspection every year, by the strengthening of the authority of the inspection unions and by the formation of a Central Union of inspection.

The Federations are also extending their activity to other spheres of agricultural life, and contribute, by their educative policy, their collaboration and the support that they give to other agricultural institutions, to the economic and social progress of agriculture. Co-operative propaganda is regularly carried on by means of numerous publications, lectures and finally through broadcasting and the film.

The Federations are also the centre of the trading activity. Special sections, formed in each group of co-operative societies, in the co-operative credit societies, the societies for purchase and sale, the dairy societies, etc., function in the same way as advisory and organising bodies. Subsequently and especially after the promulgation of the law of 1924, these sections were obliged to give up the activity which up to then they had exercised in the capacity of trading centres. This activity lapsed into the hands of central trading unions established in connection with the Federations and subjected to their control. Among these, in respect of size, capacity and organisation, the trading organisation attached to the Central Union of the co-operative societies at Prague, known as "Kooperativa", occupies the first place. This was the first organisation to attempt with success to establish in Czechoslovakia direct commercial relations between the agricultural co-operative societies and the consumers' co-operative societies, a question which has been the subject of much discussion in international circles since the Conference at Geneva in 1927. The "Kooperativa" has concluded a special agreement with the Prague Society for wholesale purchase on behalf of the consumers' societies. In 1929 the trade turnover between these two societies amounted to 2,721 truckloads. The business done by the central commercial unions of the agricultural cooperative societies in Czechoslovakia might be represented in 1929 as follows: (the values are shown in thousands of Czechoslovak crowns):

Central co-operative trading societies	Cereals		Other products		Agricultural commodities (stockfeeds, fertilisers, coal, building materials)		Total	
	truckloads	value	truckloads	Value	truckloads	value	truckloads	value
Czech	14,447	106,426	2,671	35,477	122,284	582,802	139,402	814,705
... incl. the Kooperativa	9,376	130,953	210	13,516	88,063	402,635	97,549	547,004
German	3,311	49,160	3,753	12,535	20,869	127,116	27,933	188,820
Polish	5	97	10	283	336	2,332	351	2,712
In Slovakia and Ruthenia	1,219	22,655	537	5,503	4,777	45,339	6,533	73,407
Czechoslovakia (total)	18,982	268,347	6,971	53,798	148,266	757,649	174,219	1,019,704

Apart from the central unions mentioned which function as the trading centres for co-operative warehousing societies, there are in existence central commercial unions of agricultural co-operative societies for production, as for example, the central dairying unions at Prague and Brno, the central distillery unions, those of the chicory drying societies, and several special societies, organised by the Federations, the object of which is to develop the activity of the various branches of co-operation. Four other territorial societies, in Bohemia, Moravia, Silesia, and Slovakia are engaged in the sale of livestock. In 1930 there was founded at Prague an agricultural society for the sale of live stock, under the form of a limited liability company.

All Federations are affiliated to the supreme co-operative organisation, formed in 1921 at Prague, under the title of the "*Centralkooperativ, Svaz Jednot hospodářských družstev Republiky Československé*" (Central Co-operative Union, Federation of the Agricultural Co-operative Unions of the Czechoslovak Republic). This organisation undertakes to represent Czechoslovak agricultural co-operation within the country and abroad, to protect the common interests of agricultural co-operative societies wherever the necessity for doing so is felt, and to introduce scientific methods of work into all branches of agricultural co-operation. For this purpose, there is constituted within the "*Centralkooperativ*" a Co-operative Council on which all the Federations are represented and which includes several special sections dealing with questions of a special character. The "*Centralkooperativ*" also undertakes the legal inspection of the Unions and of the societies affiliated. Frequently through its representatives and experts, it takes part in Commissions and Councils which are making a study of the economic and financial legislation of agriculture. Its name is already widely known in international circles where its collaboration is highly appreciated.

The co-operative idea is fostered by a number of educative and cultural institutions which have been formed either directly by the Federations or on its initiative, in particular by the Prague Union of agricultural co-operative societies. The most important of these is the Higher School of Agricultural Co-operation, founded in 1919 at Prague. Financed by the contributions of the Federations and the subsidies of the Ministry of Agriculture, it has a teaching staff of first rank and is designed to give a training to future employees of the co-operative organisations. Apart from the regular instruction, which is a one-year course, special three month courses are organised for employees of the co-operative societies who desire to improve their qualifications. The Inspection and Accountancy Union at Prague which owes its existence to the Prague Central Union of Agricultural Co-operative Societies and which is under highly experienced direction, has introduced a special method of popular instruction by correspondance in accountancy and general management of

co-operative societies intended for the benefit of the officials of agricultural co-operative societies.

D. CO-OPERATIVE CREDIT SOCIETIES.

Not only are co-operative credit societies the most important group of the agricultural co-operative societies of Czechoslovakia; they are also the main source of agricultural credit. The mortgage banks also give long term credit, which represents 90 per cent. of the total of credits gives. In Bohemia there are in addition 175 district associations for rural loans which also undertake a form of agricultural credit. These associations originated in the amalgamation of the former funds, known as contributions in grain, set up in the historic countries from the XVIIIth century for protection of the peasants by means of storage of certain quantities of grain in good harvest years. In this way they were ensured against starvation and had also sufficient to make the grain contributions required even in years of dearth. These district organisations supply credit on long and medium term, which is most often earmarked for the execution of works of public utility in the country. In 1929 the total sum of the deposits in these rural banks amounted to 4 milliard Czechoslovak crowns, while that of loans made amounted to 2 ½ milliards. In Moravia and in Silesia the contribution funds have not yet been amalgamated. Their amalgamation, however, on the model of the banks existing in Czechoslovakia, must soon be effected in virtue of a new law which will be enacted for the purpose. These district associations for rural loans enjoy in Bohemia the guarantee of the respective districts, as the mortgage banks have the guarantee of the provinces.

Two classes of co-operative credit associations properly so called are distinguished: 1. the 5,016 savings and loan banks on the Raiffeisen model, known as Kampelík banks or "Kampelický"; 2. the 615 saving banks of the Schultze-De-litsch model. There is no essential difference between these two classes, particularly as related to their activities. It may be said that the only important differentiation lies in the fact that the liability of the members of the latter type is limited to one or more shares, while that of the Kampelík banks are societies with unlimited liability. The co-operative credit societies in Czechoslovakia are financial establishments based on the principle of co-operation and are organised in accordance with the law of 1873. They are managed by officers, elected from among the members, and acting in an honorary capacity. The object of these societies is to make short or medium term loans, on favourable conditions to members; for this purpose they accept deposits from their members. Their owned capital is built up by 1. reserve funds, which however do not exceed from $\frac{1}{4}$ to $\frac{1}{3}$ of the deposits and for the formation of which the law prescribes the allocation of a part of the profits; 2. by shares. The safety of deposits in the Kampelík banks is guaranteed by the unlimited liability of members. Agricultural co-operative credit associations in Czechoslovakia are local institutions, without branches. Their area of operations is usually confined to the commune in which they are established; their activity covers nearly all the classes of the rural population, agricultural labourers, rural artisans, teachers, clergy, etc. Among these the farmers naturally come first, especially the small peasants who borrow money from these banks mainly in order to have the means to purchase farm requisites. Every bank is linked with one of the 12 Federations, which acts as organising and financial centre. The banks send to the Federations their surplus deposits and obtain from them the funds enabling them to make loans, if they have not sufficient available. They enjoy certain

fiscal privileges, including a minimum registration tax, exemption tax, exemption from stamp duties, and exceptional rates for the tax on net profits in accordance with the law of 1927. They may also benefit by the advantages of the fund which was constituted by the law of 10 October 1924, and which was intended to assist any financial establishment which from no fault of its own was in a precarious position. As all functions are carried out without charge, the general expenses of the co-operative credit societies are very low. On the average, calculated for the whole country, the total figure for the profit and loss account in a Kampelík bank is from 30 hellers to 100 crowns; the proportion for personal expenses is 6 per cent., or 1.92 hellers. It should be mentioned that this percentage has considerably declined in the course of the last ten years; in 1919 it amounted to 10 per cent. From the calculations made by M. Dvořák, director general of the Prague Central Union of Agricultural Co-operative Societies, a very interesting comparison was established between the different financial establishments. The following statement shows their share in the social income of the country, including interest on credit, values, commissions, etc.:

Establishments	On 100 crowns of profit pay to depositors	utilise for their own working expenses
Kampelík banks	79.15	6.52
Savings Banks.	60.20	9.83
Banks.	55.36	24.30

The low working expenses of the agricultural co-operative credit societies make it possible to secure a favourable spread between the rate of creditor interests and that of borrower. This difference is usually equal to 1.5 per cent.

The rate of interest of late years in the historic countries was only from 4 to 6 per cent. for deposits and from 5 to 7 per cent. for loans; in Slovakia and Ruthenia where the number of Kampelík banks is much fewer, the rate of interest was much higher. The fundamental principle in fixing the rate of interest consists in reducing the divergence between the two rates as far as possible, so as on the one hand to give loans to farmers on the most advantageous conditions, and on the other hand to offer them a rate of investment as favourable as, or at least not too inferior to that paid by the financial establishments of the towns.

The special conditions of agricultural production make it essential to maintain the greatest possible stability of the rate of interest, or at least suggest that all measures be taken to prevent any rapid changes. In addition to their principal mission, the Kampelík banks fulfil several other functions. It was on their initiative that a beginning was made with agricultural co-operative trading. In this sphere considerable activity was displayed by the banks, the business at the time of the promulgation of the law of 1924 having been confined to the purchases of agricultural requisites for their members. The Kampelík banks have become of importance in the historic countries, where conditions were more favourable to their formation and development than in the regions of former Hungary inhabited by Slovaks and Ruthenians. Of the 5,016 co-operative credit societies 835 only occupy the territory of Slovakia and Ruthenia. In 1919 there were in these provinces only 233 agricultural co-operative credit societies. Attempts have been made to extend over these regions the system of Kampelík banks which are at present too few and far between but obstacles are constantly encountered in the ignorance and

want of confidence of the population who remain in an exceedingly backward condition in spite of a certain progress made. The following is the financial situation of the co-operative credit societies after the War in Slovakia and Ruthenia :

Year	Number of banks	Shares	Reserve Funds	Deposits
in thousands of Czechoslovak crowns				
1919	233	3,963	2,637	56,051
1924	414	5,611	3,452	87,122

It was quite otherwise in the historic countries, especially in Bohemia. After 40 years of systematic work, the Kampelík banks have penetrated into all the regions of these provinces so that it is no longer a question of forming new banks but rather of continuing to improve the existing banks. The figures given below may convey a certain idea of the development of these banks and of their economic importance for the peasants in the historic countries :

Year	Number of banks	Number of members	Shares	Reserve Funds	Deposits
in thousands of Czechoslovak crowns					
Historic Countries 1901	1,408	125,000	1,726	700	69,231
„ „ 1912	3,588	373,624	4,875	6,642	380,003
„ „ 1920	3,753	402,010	5,450	25,068	1,612,905
„ „ 1926	4,027	537,602	8,533	67,535	3,965,532
Republic as whole 1928	4,729	712,342	20,740	80,133	4,734,968

Average figures for a Kampelík Bank in 1926.

Number of members	Number of borrowers	Shares	Reserve fund	Deposits	Loans	Average debts per borrower	Average turnover
in Czechoslovak crowns							
134. . .	78	2,131	15,119	975,000	511,000	6,551	1,651,000

The number of the two classes of agricultural co-operative credit institutions was in 1930 as follows :

	Czech	German	Polish	Slovakia and Ruthenia	Total
Kampelík Banks	3,019	1,181	65	934	3,200
Schultze-Delitsch Banks . . .	562	5	5	81	653
Both classes	3,581	1,187	70	1,015	5,853

The effect of the present agricultural crisis appears in the slower rate of increase in deposits and in the stronger demand for credit. The total deposits in the Kampelík banks amounted in 1928 to 4,734,988,000 and the total of the loans to 2,958,800,000 Czechoslovak crowns. The large total of deposits in all the agricultural co-operative credit institutions which is estimated for 1929 at 7 ½ milliards of Czechoslovak crowns, is the best proof that the co-operative credit institutions are on a solid and comprehensive basis and that they are appreciated by the farmers.

(To be continued).

O. Š.

FARM ECONOMICS

The Problem of the Farmwoman in Germany.

There are two outstanding features in the life of the German farmwoman of the present day, overwork and inadequate remuneration for work done. In an age of materialism, these tend to render rural life unattractive and are the cause for the exodus of the young women from the countryside.

A very marked change has in fact come about in the position of the farmwoman which had been consolidated by centuries of tradition. Formerly she was absolute mistress in her own kingdom. This was when peasant farming was still an isolated economy, when the farm produced only what was needed by the farming family, when the whole kith and kin of the farmer remained on the farm and formed part of it, when it was not profit that was the first consideration, but subsistence, not the making of money but the growing of food supplies. At that epoch the farmwoman had certainly plenty to do, but her work was one of direction and oversight.

Little remains for the woman of this position of governance blent with activity. The farm is now no longer the former isolated and patriarchal system; the ruling consideration is no longer that of subsistence, but of profit. The farming family no longer care to remain on the farm, they prefer to take their portion in cash and to seek some other way of livelihood away from the village.

Hence have come about the entirely changed conditions that we find to-day in rural life. The former surplus of labour has been replaced by a shortage, and with that the administrative and supervisory functions of the farmwoman have disappeared. Instead all kinds of farm work, whether in the farmyard, the stable or the field, have been imposed upon the woman, and she has to find a way to fulfil her circle of duties as mother of the family as well as co-worker, so that they may as little as possible interfere with each other.

In virtue of her main duty, that as mother, the place of the farmwoman would seem to be most closely linked with the house, the farmyard and the stables. But she can only confine herself to that sphere of duties, if all other work is undertaken by the farm servants or by the grown up members of the family. Otherwise part of the field work falls also on her, and such share will be all the greater and will the more hinder the proper fulfilment of her other duties if manual work predominates on the farm, and the cultivation is mainly that of the vine, fruit, hops or tobacco, in a word, the more the crops are hoed crops. Hoeing and weeding are mainly the work of women on the farms — the woman is apt to show more perseverance and more skill over such work and the men are quite ready to avoid tasks of this character. It may be said that the position of the farmwoman, so far as concerns the work expected of her, depends on whether or not work requiring this particular skill occurs on the farm. Such work increases the burden that presses on her, and the result must be that she soon reaches the limit of her powers of fulfilment of her duties. When duties are too many and of too many different kinds, some must be done at the expense of others since it is impossible to be equal to everything and to accomplish all satisfactorily.

The farmwoman has an immense impulse to work and extraordinary powers of application; these are in her blood and inherited from former generations. But even these qualities cannot increase the possibility of fulfilment of her duties. This very power of application makes her old before her time, and gives her the harassed, discontented and overworked expression that is characteristic of her. From the recognition of the fact that she can never be equal to all there is to do simply because

there is not time and strength for all, she is bound to arrive at the conclusion that it is necessary to lighten the work where it can be done without economic loss. In the first instance it is clearly necessary to secure a livelihood, and consequently she will try to accomplish all the work essential to the working of the farm, since any neglect of these tasks would endanger the welfare and even the very existence of the family.

The only part of the burden of the farmwoman that can be lightened without economic disadvantage is that relating to her duties as a mother, and if she arrives at such a conclusion it is the more easy to put it into practice, since the farmer regards his wife from the economic side and merely from the point of view of her output. Although this conception is quite foreign, and indeed opposed, to the nature of the farmwoman herself, it is the outcome of and has been fostered by the changed conditions of our times and to a great extent by the crisis which is now prevailing in agriculture.

Formerly the farmwoman took part in the necessary hoeing and weeding and in the harvest work only if the work could not be accomplished otherwise. Her assistance was only given at times when there was a great quantity of urgent work. To-day things are very different. By the rural exodus the farm has lost its workers, or where this has not been the case, the low returns of the farm have resulted in the diminution of the number of farm servants. In consequence either the woman must undertake the extra work or the farming must be become more extensive in character. This latter alternative is in many cases out of the question, as at least in South German conditions the very small holdings would not afford subsistence unless worked by intensive methods. Hence the lot of the woman on the farm is bound up with the intensity of the manual labour needed, taken together with the labour supply or want of supply. The tendency seems to be for her lot to become still harder. The conflict between her farm duties and her maternal duties must become sharper and one or the other must suffer.

The working hours of the woman on the farm have been reckoned to be as many as 4400 per annum, and she works per day up to 15 hours and more. In addition she has to fulfil her duties as mother and to bring up her children. Her work goes on the whole day and is done in a continual bustle, one job on the heels of the last and no possibility of accomplishing any one job in orderly fashion.

By steady perseverance the farmwoman succeeds in performing all her manifold tasks, but they exhaust her frame and ruin her health. Of all the members of the farming family, the woman is undoubtedly the most driven, always surrounded with work which at times she simply cannot overtake, because strength and time do not permit, especially if she has a large family of children. From this untoward lot of the woman on the farm there arises, at least in South Germany, yet another related problem.

This consists in the fact that the farmwoman is beginning to be an increasingly rare phenomenon. The daughters of the farming family, who see what is the lot of their mother, prefer to marry an artisan, a factory worker or a man in employment of some kind, rather than a farmer. The feature which renders the life of the farmwoman so unattractive in the eyes of the younger women is the necessity for the hard work in the fields in addition to the household tasks.

Those daughters of the family who from early youth have never left the farming occupation are the ones who usually remain faithful to it. All they know is that work has to go on from early morn till late evening, and if the village lies at some distance from town or factory, they have no girl companions who are not looking forward to the same destiny. It is when there is comparison with other women

who fare better than themselves as regards hours of work or remuneration, that the temptation not to remain on the family farm begins. When the village lies near a town, or where the population is largely composed of factory workers, the comparison is almost always to the disadvantage of the life of the woman on the farm. In such localities the outlook on life of the younger people tends to become transformed and modernised. The first question in regard to the choice of a husband or of an occupation is: "Where shall I enjoy life most? where shall I get most money? where will work be most agreeable and least tiring?"

The tendency to forsake the traditional occupation is also marked when the daughter of a farming family has become unused to rural life from having entered domestic service in the town. Here the comparison with the village and the village life becomes more acute, and there is the attraction of better and more dainty garments, the free time in the evenings, the less fatiguing — and in their eyes less degrading — work, which all constitute an attraction to the town. This changed outlook is partly brought about by the influence of the notion of the farming class held by the townsman to which he gives such free expression when speaking of the country people. For the majority of townsfolk the word "Bauer" calls up an image of want of education, oldfashioned ideas, and general inferiority. No townsman takes the trouble to form a correct idea of the farming class and of all the mental qualities that it represents. Hence the young country woman engaged in the town naturally comes to regard the town as entirely desirable, while her dislike for the idea of farm work increases.

These ideas, and this lack of proper sentiment and pride must be combatted in the young women and girls of the countryside before they find their way to the town.

To attain this end it is essential that the sons and daughters of the farming family should be educated on a plan altogether different from that followed in the case of town-children and the children of the industrial workers. The teacher in the country school who will be the first to wage the struggle against the rural exodus, must himself be country born and if possible the son of a farmer. He must have in himself the spirit of the countryside and must have no longing for the town or for a better paid post in the town.

Thus it is that the problem of the farmwoman is based in the first instance on the possibility of lightening toil and thereby rendering her life more tolerable. It is the uninterrupted stress and strain of work which makes the young woman prefer to marry an artisan, an employee or a factory worker rather than a farmer. One can hardly blame her for wishing to live her life under favourable conditions as regards the work that has to be undertaken.

It should not be forgotten that hard work would be more endurable if it were accompanied by some sense of progress, imparting a feeling of satisfaction and a desire to do more work. But in the present conditions of farming, the poor remuneration, the absence of any sense of progress have their natural consequences in the rural exodus.

The whole situation of the farming economy, the overwork of the woman, the low rate of remuneration, the compulsion to extreme parsimony, is closely linked with the problem of depopulation which up to now has been balanced by the large families of the rural population. In the country the birth rate is still in excess of the death rate, but the excess of births in the country can no longer make up for the enormous falling off of births in the towns. In addition, the overwork, poor remuneration of labour and the necessity of exercising the strictest economies contribute to swell the rural exodus. From beneath and from above there is a slow process of destruction of the solid structure of the rural population. From below, this consists

in the fall in the birth rate which is often to be found in the country as in the town, while from above, there is a constant drain of the good workers who leave the country side in search of better payment and more leisured conditions of life.

Steps must be taken to counteract both the one and the other of these two forces ; the farming class must receive support and encouragement, not merely from the Government, but also through the improvement of conditions of rural life, lightening of the burden of overwork and raising of the remuneration of labour.

One of the possible methods of achieving such amelioration consists in technical instruction which enables the farmer to work his farm on modern scientific lines, involving labour saving ; the other lies in the formation and utilisation of the co-operative system for purchase and sale, for provision and employment of machinery, for everything in respect of which the isolated farmer is economically too weak. Through the development of co-operation, the small farmer stands to gain the advantages of the larger farm undertaking. He must however identify himself to the utmost with the co-operative organisation, and must not simply look upon the co-operative society as the resource that will always be there supposing he cannot sell his products anywhere else.

If it is true that a sound economic policy is also the best demographic policy, then it follows as a matter of course that it is a vital question for the German nation to maintain in a sound economic position that section of the population which has up to now done so much to ensure the stability of the nation. It is to-day no longer merely a question of agricultural policy but one that affects Germany as a whole and concerns the whole nation and its future.

From the perennial fecundity of the country the life and strength of the towns is drawn. If this spring of vital force should be dried up, either as the result of the untoward economic situation, or on account of the undue burden of work that falls on the farmwoman, it is hard to know whence the regenerating forces are to come.

It may be asked for how long the stream of sound vitality which now flows from country to town will continue to flow, and when the country will no longer have any to supply. All possible support and encouragement should therefore be accorded to both farmer and farmwoman in their work and in their duties, since in the farmhouse is most often found that healthy family life in which the presence of children is still regarded as a blessing.

For this reason the problem of the farmwoman cannot stop at the question : Am I to marry a farmer or not ?, nor even at the question : Does the agricultural situation and my own burden of work allow me to have a large family or not ?. At the present juncture, the farmwoman is the main prop of the German nation.

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[The perusal of this book which originated as a Seminar course at the University of Tübingen takes us back into the atmosphere of the Middle Ages, and of the political and economic feuds of the free Imperial city of Esslingen with the principality of Württemberg. The interminable struggle was waged mainly over the supply of grain to Esslingen which had only a small area of hinterland and, wedged in as it was between lands belonging to Württemberg, was entirely dependent for its grain on import from

outside. The provisioning of Esslingen became particularly difficult by the rise in the sixteenth century in the towns of the principality of Württemberg of their own grain markets. The question of feeding a large section of the population of Esslingen thus became a matter of public concern.

The first record of the grain trade policy of the Imperial city dates from 1350. It was the endeavour of Esslingen to bring grain into the town by special measures, without coming into conflict with the privileges of the neighbouring lords and so to arrange that the peasants obtained cash prices for their grain. Certain advantages resulted from the fact that in the measuring of grain the fixed unit of measurement was smaller in Esslingen than in Württemberg. Also the prices of grain were generally somewhat higher in the Imperial city than in the principality. The foreign farmer hence obtained advantages on his grain deliveries, consisting in a double premium on import, *viz.*, as regards both the quantity introduced and the price paid. The tariff policy of the State was on its side calculated rather to serve reasons of economic policy than financial or fiscal objects.

Grain trading on the city market was regulated in the most far-reaching manner by market regulations. Grain was sold only at the place and time prescribed for its marketing by the authorities and had to be consigned at the *pretium justum*, according to the economic canons of the day. There was a strict prohibition of intermediary trade or resale, the object being to allow no speculation to arise in connection with grain trading. The grower only had the right to market his grain. Bread-making and sale of bread were also supervised and regulated as to weight, quality and prices. None the less these measures proved ineffective in securing the supply of bread to the town, especially during the hunger blockades which were often proclaimed by Württemberg. The struggle, which was waged with varying types of weapons and with changing fortunes up to the beginning of the XIXth century, ended in 1802, when the free Imperial city came under the power of the principality.

From the historical perspective this struggle for bread in some forsaken provincial town of Southern Germany is no more than a small episode in the general economic policy of mediaeval cities. Even so, the book, which has been composed with the greatest possible care from archives, and written with great clearness, would have been of interest for the political and local history of Württemberg alone. The bread supply and the grain trade have in modern time grown from a local problem existing within narrow limits to an international problem. In Fettel's work we learn to recognise this problem in its origin, its primitive state as yet not burdened with the capitalistic economy of the following centuries and become hard to survey from its range which is as wide as the world itself. The special value of this book lies in this, and it will be valued as such by all who interest themselves in this problem of modern agricultural policy].

ORWIN, C. S. *The future of farming*. Oxford : The Clarendon Press. 1930. 156 p.

[Agriculture in England is admittedly passing through a severe crisis and the general attitude of the English farmer is that nothing which he can himself do will restore prosperity to the farming industry and that it can only be saved by protection or the artificial stabilisation of prices. By many persons, co-operation in marketing is advocated as a remedy, but even the advocates of co-operation seem to argue on the assumption that English farming practices cannot be improved.

Mr. C. S. Orwin, whose competence in agricultural economic questions must be recognised even by those who do not agree with his opinions, takes an entirely different view. He challenges, as economically unsound, the characteristic English system of mixed husbandry and rotation farming, under which barley, wheat and oats are grown for sale and green crops for consumption by cattle and sheep for the production of beef and mutton or of store-stock. He points out that it is precisely where mixed farming prevails that the farmers' difficulties are greatest. Where specialization has occurred, as in dairying, in grazing for meat production, and in the raising of store-stock, the farmers are, generally speaking, in a sounder position.

The remedy for agricultural depression, in Mr. Orwin's view, lies in specialization, accompanied by the application of the results of scientific research, and by the more extended use of machinery. Some forms of specialisation can be carried out on small holdings or, as Mr. Orwin prefers to say, on "family farms", and he advocates an extension of family farms in the comparatively few districts where this type of farming is traditional, but deprecates the promiscuous formation of small holdings. Mechanisation, how-

ever, requires larger units than the typical English farm, and could only be adequately carried out on large open fields formed by consolidating farms and grubbing up hedges. Mr. Orwin urges, therefore, the creation of what he calls "factory farms", fully equipped with mechanical power and machines designed for the sole purpose of operation by mechanical draught, in which the technical management is departmentalized and the whole undertaking is placed under the control of an expert financial manager, reviewing the work of the technical departmental chiefs in the light of the evidence of a complete system of cost accounts.

Regarding it as out of the question, under present conditions, that "factory farms" could be created by private enterprise, Mr. Orwin urges that the State itself should create them, purchasing the land from the landowners and paying compensation to the tenants whom it would be necessary to disturb. He does not suggest that the State itself should farm the land, but that it should let the farms to joint-stock companies formed for the purpose. Until, however, the investing public becomes accustomed to subscribe for shares in such companies as readily as they now take shares in companies formed to work tea or rubber plantations, it might also be necessary for the State to finance the undertakings.

As a preliminary to the formation of factory farms Mr. Orwin suggests that a national survey should be made to determine the regions adapted to specialisation in particular branches of farming].

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[The above is a paper read before a branch of the Agricultural Bureau of South Australia by the Director of Agriculture. Statistics of world production of wheat and of exportable surpluses are quoted. It is noted that as the exports of the Southern hemisphere, available in the first half of the calendar year, form 31.8 %, as compared with 68.2 % from the Northern hemisphere in the second half, the direct competition of Australian wheat is with one-third only of the world's export surplus. The possibility of gradual replacement of the other cereals in use in many countries by wheat as human food is also discussed. In regard to yields it is pointed out that on the whole the highest mean yields per unit of area are obtained in the northern countries with the longer growing period of wheat ; in Australia and Argentina, where wheat comes to maturity in six or seven months, yields are inevitably smaller, although this handicap can be largely overcome by good farming methods].

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OF

AGRICULTURAL ECONOMICS AND SOCIOLOGY

FARM ECONOMICS

Some Results of the Comparative Statistical Study of Farm Accountancy Data in Certain Countries for 1927-28.

In the monograph the first part of which appears here and which will be continued in subsequent numbers of the International Review of Agriculture, it is proposed to state the reasons which have induced the Institute to undertake the comparative statistical study of the results of farm accountancy in the different countries, as well as to indicate not merely the positive results obtained but also the difficulties encountered in the course of the inquiries, the lacunae that it has not been possible to fill and the lines of improvement which appear to be indicated.

The present monograph thus contains an analysis of the figures published in our "Recueil de statistiques basées sur les données de la comptabilité agricole, dans certains pays pour 1927-28", the first piece of work of this type attempted by the Bureau of Economic and Social Studies of the Institute. It presents a survey of the results obtained and of the possibilities offered by the systematic development of work of this character.

INTRODUCTION.

(a) General.

In the course of centuries farming has passed through a number of economic phases becoming increasingly subordinate to the market it supplies. The farm, and in particular the large farm, is in fact a kind of factory in which the products of the soil are transformed for sale becoming like those of industry, subject to the law of supply and demand. To meet competition the farmer is compelled to reduce his production costs by a scientific organisation of his enterprise. Farm accountancy makes it possible for him to calculate with exactness the different items in his expenditure and in the results he obtains; hence this accounting is the first and most essential means of rationalisation of the agricultural industry.

(b) Definition and development of farm accountancy.

Farm accountancy which seems to present more difficulties than commercial accountancy has not always been that exact and complete science of accounts described by the modern writers on the subject (1).

(1) Farm accountancy, according to SCHÄR, is "that statement of the establishment, the working and the liquidation of a private economic unit, which describes, under the form of calculations, on the one hand the circulation of the commodities owned by it while fixing their value and quantity, and on the other hand the expenditure and returns". According to POHL, "It groups, registers and makes an abstract of all the items of production and consumption which have a scientific value for the future, or in other terms, all the turnover of funds of an economic enterprise".

At the time when the farm regulated its production solely in accordance with its own requirements and needs, it was sufficient to undertake single enquiries the object of which was to calculate the consumption of a farming family, showing in detail the receipts and expenditure of this family. When the farm came to resemble an industrial or commercial undertaking and began to produce with the object of marketing its products, a regular system of farm accounts had to be evolved. This required the keeping of several books, in which were recorded the assets, the liabilities and the transactions of the farmer (1).

(c) *Utility of farm accountancy.*

An accountancy on these principles is of the greatest service to the farmer. The divergence between the cost of production and the selling price of his products is an indication of the method to be followed in the general organisation and scientific management of his undertaking. The economic capacity of the undertaking is measured by the determination of the economic or social income, which is made up of all the returns which are made by the enterprise to himself, as well as to other persons and the State, viz., the net return, remuneration of labour, and taxes. The keeping of accounts also keeps him in touch with the market position. He learns to know the proportion of the articles of prime necessity that he obtains from outside and of those he produces himself, he develops his power of judging values and his methodical sense. The impartial results of his accountancy is a protection against fiscal exactions; he can obtain rebates on taxes if the burdens on the farm are too heavy.

Drawn out over a number of years, the farm accounts form a kind of economic history of the undertaking reflecting its vicissitudes. Moreover if the farmer introduces into the table of the collected results the variations in the cost of commodities, it will be possible for him to estimate approximately the production costs of the year in course.

Hence it becomes possible through the farm accountancy to arrive at a solid basis, for each farm, for the solution of the problems of the rural economy and to meet the requirements of the modern organisation of the farming enterprise.

On the other hand, accountancy is becoming one of the most important empirical bases of the science of rural economy, and is beginning to throw new light on the questions raised by this science, as well as on the social antagonisms of rural life. It can tell us what the producers, agricultural and non-agricultural, earn and spend, the savings and the consumption of workers, officials and peasant farmers. It supplies elements capable of giving support to the principles of agrarian policy, to the claims of the peasant class and to the measures to be taken to protect their interests.

(1) The books usually kept by farmers are: 1) the *inventory book* (in some cases a *ledger* is used), containing the entries, which serve to ascertain the assets, liabilities and the resulting family capital; a *cash book* in which are entered day by day the receipts and expenditure in cash; the *household book* which shows the transactions in kind; the *labour account*; and finally the *ledger* bringing together all the information contained in the preceding books and making it possible "to determine the variations in the family capital, to calculate the personal expenditure, the income of the farmer, his remuneration and the interest on the capital invested in the farm" LAUR. *Comptabilité Agricole*, p. 8). Certain modifications in the books kept depend on whether the single or the double entry system of book keeping is adopted on the farm,

Farm accountancy is in fact an indispensable aid to all who wish to study, on the basis of actual fact, the problems of rural economy from the point of view alike of the farm and of the nation, and is indeed among the most valuable means of throwing light upon conditions of farming throughout the civilised world. It collects precise data making it possible to counteract or at least to weaken the effects of the crisis from which all countries are suffering and which has in great measure arisen as a result of the competition which each has to face on the world market.

Up to the present accountancy results have had no practical value except for those countries taken in isolation which have established them, without taking into account the attainment of objects of an international character. Now that the market of agricultural products has become international, and that the problems of agriculture, even under their purely national aspect, can be studied only by taking account of the existing conditions in the competing countries, it may be said without exaggeration that very great importance attaches to comparative studies dealing with returns and production costs in the different countries. International comparisons of the main results of accountancy, gross return, farming expenses, net return and family farm earnings give authority for drawing conclusions on the situation of world agriculture, provided only that in each country there is a sufficient number of properly selected farms under survey for this purpose, so that the averages obtained will be really representative and that the comparison will not be of a purely mechanical character.

The expression "comparative study of results" cannot be understood in the strict sense of the term. Even when reduced to gold francs, the comparable monetary unit, the results are heterogeneous, in consequence of the differences in accounting methods, in agricultural organisation, in the purchasing power of gold itself, etc. But while it is desirable to abstain from any attempt at direct comparison of financial results as from one country to another, it is permissible to utilise these empirical data in such a way as to make clear the influence of the natural and economic conditions of each region on accountancy results, as well as to illustrate the tendencies in the development of agriculture due to these conditions.

Studies of this kind would render in addition great services to agrarian reform; they would render it easy to establish standards of good farming in relation to the local conditions.

The International Institute of Agriculture in pursuance of the plan of Dr. Laur established in November 1927 and in October 1928 the essential principles of the methods of an international statistic based on the data of farm accountancy. The International Congress of Agriculture held at Bucharest in 1929 approved the scheme as outlined, and the International Institute of Agriculture undertook to collect the necessary material. Under its instructions two experts visited 16 countries of Europe in particular Germany, England, Austria, Denmark, Estonia, Finland, France, Hungary, Latvia, Norway, Netherlands, Poland, Rumania, Switzerland, Sweden and Czechoslovakia, and collected the accountancy data of the years 1927-28.

The statistical elaboration of the materials thus collected has lately been accomplished and the result is published under the title: "*Recueil de statistiques basées sur les données de la compatibilité agricole pour 1927-28*".

In the course of this series of articles it is intended to study the positive value of the results thus brought together, the lacunae that it would be desirable to fill; an attempt will be made to make evident the deductions that it has been possible to draw, and to show by examples some of the investigations which it will be possible to pursue so soon as the documentation of several successive years is in hand.

PART I.

LACUNAE AND TECHNICAL DIFFICULTIES.

(a) *General Considerations.*

The documentation collected is rich and varied ; giving a good general view of the situation and organisation of farms in the different natural and economic regions.

The tables shown in the " *Recueil* " are not however all of equal value. Those which give the publication its real value are the tables relating to the principal results : capital invested in agriculture, gross return, production costs, final results.

In this series of articles attention will be directed on the principal results of the farms engaged in wheat growing, growing of potatoes or sugar beet, and stock farming ; later in a second part the results of all the farms which will be so grouped as to bring out clearly the general tendencies. The total number of the farms dealt with in the " *Recueil* " is 8,791 with a total area of 624,045.15 hectares. The distribution of this total among the different countries and size groups is shown in the following table. For each country there is shown, as compared with the number of farms whose accounts were examined by the Accountancy Office and their areas, the total number of farms in the country in question with the aggregate area of such farms. A percentage is thus calculated which will be the measure of the representative character of the farms examined by the offices and contained in the " *Recueil* ".

France is omitted from the above statement as this year accountancy data were supplied only for a single farm in Seine-et-Oise, the book-keeping of which was of a prevailingly commercial character. There are also omitted five provinces of the Netherlands which had not completed the enquiry schedules as had the three other provinces of Zwolle, Friesland and Groningen, and whose results were therefore incomplete ; also certain farms in England and in Hungary. Hence the investigations cover 8,165 farms of a total area of 604,017.40 hectares.

According to the principle adopted at the international Congress of Agriculture at Bucharest, the farms have been divided into two size-groups, *viz.*, peasant farms and large farms, as are shown in the table above. Peasant farms are those on which the head of the family and its members perform manual work ; it is not necessary to engage special managers or overseers. On the large farms the head of the family takes no part in the practical work ; he is in addition assisted by managers. The size of the farms belonging to one or other class may vary markedly from one country to another, according to the special circumstances ; but all the farms of all countries of the same size-group correspond none the less to the type-farm ; their organisation is the same and they are therefore comparable between themselves.

Only the Accountancy Offices are competent to divide the farms into the two size-groups. The average size of the farms under survey varies between 3.76 to 2305.45 hectares. The average size of the farms of Switzerland, Austria, the Netherlands, Poland, Rumania, Norway, Latvia and Estonia does not exceed 50 hectares. Hungary is the country where the average size of the farms is the largest. The most abundant supply of material comes from Germany. The average area of the 1641 German farms varies from 13 to 948.75 hectares, with a regular progression as far as 400 hectares.

The " *Recueil des statistiques* " forms a kind of inventory of the material collected by the experts of the Institute. The object actually and properly pursued in its compilation was, not a mere devotion to special studies, but to show whether

TABLE I. — *Representative Character of the Farms in the Recueil.*

N.	Country	Farms the accounts of which were surveyed by the Accountancy Office						All farms of the country			Farms under survey	
		Peasant Farms			Large Farms			Number (1)	Average area	Area cultivated (1)	Number in % of total of the country	Area in % of the total area of the country
		Number	Average area	Total area	Number	Average area	Total area					
		ha.	ha.	ha.	ha.	ha.	ha.	ha.	ha.	ha.	%	%
1	France	—	—	—	1	125—	125—	—	—	—	—	—
2	England	80	86.85	3,387—	107	129.95	14,974.60	390,247	(4) 45.91	(2) 18,329,805	0.087	0.10
3	Netherlands	1,987	30.28	60,174.47	—	—	—	221,650	(4) 10.29	(2) 2,282,264	0.800	2.64
4	Denmark	573	22.66	12,985.80	153	122.49	18,740.80	205,929	(4) 14.28	(2) 2,041,746	0.350	1.08
5	Germany	1,641	44.33	72,744.20	657	346.81	227,851.75	5,120,000	(4) 6.74	(2) 29,400,426	0.045	1.02
6	Switzerland	468	11.83	5,537.20	32	50.40	1,612.80	243,710	(4) 9.01	(3) 2,196,511	0.205	0.38
7	Austria	397	84.66	9,791.92	—	—	—	—	—	(2) 4,366,978	—	0.22
8	Czechoslovakia	221	17.56	3,880.94	26	99.99	2,599.31	1,618,710	(4) 5.37	(2) 8,096,548	0.015	0.07
9	Hungary	104	15.69	1,631.76	92	1,435.47	117,706.08	850,760	(4) 8.55	(2) 7,581,742	0.022	1.58
10	Rumania	68	29.06	1,890.90	—	—	—	—	—	(3) 17,419,768	—	0.01
11	Poland	804	13.64	10,987.59	—	—	—	3,261,908	(4) 7.56	(3) 24,674,400	0.025	0.04
12	Latvia	117	45.57	5,331.69	—	—	—	192,174	(*) 17.51	(3) 3,364,082	0.061	0.16
13	Estonia	250	41.84	10,400—	—	—	—	138,357	(4) 21.04	(3) 2,806,429	0.187	0.37
14	Finland	414	19.59	8,110.26	75	84.06	6,304.50	250,749	(4) 13.40	(2) 3,361,005	0.195	0.43
15	Norway	180	17.26	3,279.40	—	—	—	—	—	(2) 944,204	—	0.35
16	Sweden	296	11.35	3,245.56	104	199.70	20,798.52	447,808	(4) 10.47	(2) 4,689,999	0.087	0.51
		7,554	22.24	213,358.49	1,237	332—	410,686.66	12,946,008	(4) 10.27	133,015,507	0.068	0.47

(1) Taken from the International Yearbook of Agricultural Statistics. — (2) Cultivated land. — (3) Area including forests. — (4) These figures indicate that in each one of the countries under consideration accounts are not kept on the very small farms which are the most numerous, even in countries such as Switzerland and Poland where the average area of the farms examined is small.

it were possible to establish international comparable statistics of accountancy data. With a view to proving the value of the attempt thus made, in the following pages some of the more important problems of rural economy will be attacked.

(b) *Difficulties of Technical Elaboration.*

As was enunciated in the foreword of the "Recueil de statistique" the farm forms an organic whole, in accordance with the principle adopted at the Bucharest Congress. Hence, as Dr. Laur has expressed the point in his "Terminology and Bases for an Use in International Statistical Researches Based on Farm Accountancy": "Forestry forms a branch of agriculture in so far as the forest, by supplying occupation to the farm workers and the work animals, is a source of additional income and a reserve for the farm. However when the importance of forestry is relatively considerable, it will be better to make a distinction between forestry and agriculture".

Difficulties however have arisen when it has been necessary to apply this principle to the transformation of the results which have to be reduced to the hectare or multiplied by the number of hectares. The Offices have indicated average areas differing very considerably, being those used by them in their statistical work (1). It will probably never be possible to obtain in this sphere uniform indications, and on the solution of this problem depends mainly the exactness of the work of international statistics based on accountancy data. The principles of grouping which have been adopted by the Offices for completing the questionnaires differ greatly among each other (2).

- (1) England apart from forests.
 Netherlands apart from forests.
 Denmark apart from forests.
 Germany area under cultivation apart from forests.
 Switzerland all the cultivated area including forests.
 Austria all the cultivated area including forests.
 Czechoslovakia cultivated land apart from forests.
 Hungary all the area apart from forests.
 Rumania all the area including forests.
 Poland all the area including forests.
 Latvia all the area including forests.
 Estonia all the area including forests.
 Finland cultivated land apart from forests.
 Norway apart from forests.
 Sweden apart from forests.
- (2) The grouping is in :
 England : according to farming systems ;
 the Netherlands : according to farming systems ;
 Denmark : by order of size ;
 Germany : according to farming systems, by size and by regions ;
 Switzerland : partly by farming systems taking account of size groups, partly by size-groups without taking farming systems into account,
 Austria : according to farming systems ;
 Czechoslovakia : according to farming systems and regions ;
 Hungary : by regions ;
 Rumania : according to farming systems and regions ;
 Poland : according to regions ;
 Latvia : forms one group of all the farms of the country ;
 Estonia : forms one group of all the farms of the country ;
 Finland : groups by regions (all the farms belong to the system of farming by cattle raising) ;
 Norway : forms one group of all the farms of the country ;
 Sweden : groups according to farming systems, by size and by region.

As however will be seen later, the results obtained reflect the life of the farms under survey and the degree of comparability is sufficient.

The designation of the farming systems also differs much from one country to another (1).

In order to arrive at a clearer point of view, it would be better to take as a basis the crop yield and the distribution of the cultivated area and to give to the farming systems a designation determined by the predominance of a crop or a cultivation. The scientific value of the work would be in no way diminished thereby, and the Offices of the different countries would not have essentially to modify their

(1) England	grassland farms mixed farms farms growing field crops farms under cereal cultivation.
Netherlands	grazing farms dairy farms mixed farms mixed live stock and crop farms farms under cereal cultivation.
Denmark	
Germany	grass production farms with pasture grass production farms without pasture farms growing forage crops farms engaged in production of beef cattle mixed farms farms under cereal cultivation farms under sugar beet farms growing potatoes farms distilling potatoes farms growing vegetables.
Switzerland	grass production farms farms growing mixed forage crops alp pasture farms dairy farms farms engaged in beef cattle breeding farms practising a three year improved rotation grass production farms with some fields grass production farms with intensive arboriculture vine plantations with other crops
Austria	grassland farms with or without alpine pasture farms mainly growing cereals mixed farms with prevalence of wine growing vine plantations with other crops in combination farms with predominance of forest.
Czechoslovakia	farms growing forage crops mixed cereal and potato growing farms growing sugar beet.
Hungary	—
Rumania	farms with predominance of forest mixed farms.
Poland	
Latvia	
Estonia	
Finland	farms engaged in different forms of cattle raising.
Norway	
Sweden	grass production farms with some rye and barley mixed (cereals with some sugar beet) mixed (sugar beet with some cereals)

methods of investigation. There need only be taken into consideration the principal crops which play a part in the formation of the prices of the main products on the world markets (1).

The following tables give a comparison of the results of the most important farming systems (see pp. 170-7).

The dashes in Table II indicate the lacunae which are considerable. Except from the Brunswick Office, no particulars were supplied from Germany, and the same is true of the Netherlands. Neither Finland nor Hungary indicated the farm debts or the family capital. The same would be true of Denmark, Sweden and Norway if these countries had been shown on the table. The Offices of Newport (Salop), Cambridge, Leeds and Oxford, which are all situated in regions where the majority of the agriculturists are tenant farmers, have entered under the heading of landlord's capital only the rent and all that the tenant farmer puts into the soil, for which he is entitled to compensation if the lease is terminated, including the unexhausted cultivation values, the standing crops, the new plantations and the new repairs.

It is unfortunate that complete data are not available for the sixteen countries. The capital invested in agriculture is one of the best criteria possessed of the situation of agriculture and the only factor that makes it possible to measure the net return.

Irregularities in entering the cash balance (as in the Netherlands and in the Northern countries) and the own capital reduce the value of the table. It becomes thus impossible to calculate the proceeds of the work which is obtained by deducting the family capital from the agricultural income, or to make a comparison between the fair remuneration of members of the family, calculated on the basis of the wages of farm servants by the year, and the total sum brought in by the work done by the family. The average proceeds of the work done on Danish farms in 1927-28 was 102.69 gold francs to the hectare, and the fair remuneration was 205.37 gold francs per hectare. From this example it appears that the farming family has earned less than the workers engaged by it.

On the other hand, the absence of information in respect of the family or own capital makes it difficult to estimate its place in the farm economy. The own capital is in itself a valuable means of investigation, as may be best shown by means of an example. The average net return of all the farms of Switzerland amounted to 123.98 francs per ha, and the interest earned on capital was 1.99 per cent. The farm assets placed in a bank at an average rate of 4 per cent. would have brought in

$$\frac{7048.93 \times 4}{100} = 281.95 \text{ francs.}$$

Farm debts amounted to 3,464 fr. per hectare, and

the interest at 4 per cent. to 138.59 francs. The net return could not cover the interest on the debts; the farmer would be obliged to charge 138.59 — 123.98 = 14.61 francs per ha. out of his own capital to pay the interest on his debts, if he had not had subsidiary income. He has had to give up all his earnings to a single creditor.

As in Table II of capital invested, considerable lacunae appear in Table III of gross return, and the entries in the accountancy books vary somewhat from one country to another. Thus, it has not been possible to indicate the components of the gross return of the farms of Germany: contributions in kind have been estimated in block, and the Office has published the receipts only. Hungary has also not supplied the detail of the gross return. In the gross return as supplied by the Netherlands there is no mention either of the renting value of buildings or of the contributions in kind.

(1) Proposal of the Berlin Office. The table of farming systems on p. 15 of the Institute questionnaire seems somewhat overloaded and might be simplified and better adapted to the requirements of international statistics.

On account of technical difficulties, due to the adoption of a double entry system, Czechoslovakia has not analysed the gross return nor the farming expenses. All that has been supplied is the net return, which will be dealt with later.

Apart from these exceptions, a glance at the tables will show that the totals are sufficiently comparable and that no great divergence is noticeable among them. Differences are partly due to the degree of intensity of the farms. The countries where small ownership predominates, such as Switzerland and the Netherlands, have intensified their cultivation, while the large estates, for example in Hungary, are farmed more on the extensive system. The gross return of these does not exceed 300 gold francs to the hectare, while in Switzerland it rises to 1300 gold francs per hectare. The farms of Germany growing potatoes also show a decline in return as the area increases.

The differences noted are also due to other causes, such as the weather and other natural conditions, means of transport available, market outlets, etc.

The greater number of the data relating to farm expenses have been supplied by the countries, with the exception of Czechoslovakia, which, for the reason stated, has not been able to enter the analysis of these expenses in the schedule. Table IV reflects, as did the previous tables, the general tendencies and the life of the farms. The countries where intensive cultivation is the rule have in addition to the higher gross return also the higher farming expenses. It is however noticeable that the farming expenses in the Netherlands remain much below those of farms in Switzerland. This difference is due to the fact that in the Netherlands the farming expenses do not include amortisations, taxes, expenditure of the farmers on forage, fertiliser and seeds, the full remuneration of the work of members of the farming family, and the household expenses. Accountancy systems in the Netherlands are adapted to the special conditions of the country, are intended to meet fiscal requirements and calculated a family farm earning which represents what remains to a peasant who is freed from debt and does not pay taxes.

The farms in Germany which grow potatoes appear to show, as for the gross return, a decrease in farming expenses in proportion as the area increases. Those which grow sugar beet have inevitably a much larger expenditure on labour, and hence current expenses and farming expenses are higher. Labour costs are naturally less on grass production farms than on farms growing cereals and root-crops. In Switzerland, the cost of labour is double what it is in other countries.

England, Germany, Austria, Czechoslovakia, Hungary, Sweden and Norway have not shown the interest of capital invested in agriculture and consequently the total cost of production is not shown, since that is obtained by adding the interest on the various forms of capital to the farm expenditure, which is composed of the labour costs and the current farm expenses taken together. This is a lacuna which is unfortunate, since the profit or loss on total farm assets, which is obtained by deducting the total production costs from the gross return, would be of great utility to international statistics, by supplying a solid basis for the price policy the scope of which will be widened by these statistics (1).

(1) To quote Dr. Laurin "Terminology and Bases for use in International Statistical Researches based on Farm Accountancy", "The profit or loss on total farm assets, if expressed in percentage of the cost of production, shows the proportion in which that cost should have been higher or lower for the year to close without any loss or profit. If expressed in percentage of the gross return, it indicates the proportion in which the average price-index ought to have been higher or lower in order that the cost of production be exactly covered". Expressed as a percentage of the total capital invested, this profit or loss on total farm assets indicates the rate at which the farm enterprise would have invested its funds if it had paid to the estate the interest claim. Later an instance will be given taken from the results of the countries which have supplied all data.

TABLE II. — *Capital invested in agriculture. Values in gold francs per ha. for 1927-28.*

Serial no. in Recueil (1)	Country	Region	Number of farms	Average area ha.	Farm Assets			Farm debts	Own or family capital
					Land- lord's capital	Tenant's or opera- ting capital	Total assets		
A. — Farms engaged mainly in cattle raising.									
2b	England	Leeds	22	159.72	(2) 50.13	402.05	453.08	—	—
2a	Germany	Bavaria (A)	50	13.—	—	—	—	—	—
7a	"	Bavaria (A)	108	14.—	—	—	—	—	—
10a	"	Silesia	53	22.—	—	—	—	—	—
3a	"	Bavaria (B)	30	28.—	—	—	—	—	—
4a	"	North (5 to 50 ha.)	49	30.—	—	—	—	—	—
9a	"	Eastern Prussia	45	33.—	—	—	—	—	—
12a	"	North-West (North)	29	34.—	—	—	—	—	—
8a	"	Bavaria (B)	165	41.—	—	—	—	—	—
6a	"	Centre	63	46.—	—	—	—	—	—
11a	"	North-West (west)	80	66.—	—	—	—	—	—
5a	"	North (50 to 200 ha.)	40	91.—	—	—	—	—	—
1a	"	Centre (Brunswick)	1	125.50	1,334.54	520.49	1,855.03	124.67	—
3a	Switzerland	All parts	36	8.91	—	—	6,654.22	1,973.86	4,680.36
6a	"	"	47	9.71	—	—	6,856.30	—	—
4a	"	"	48	10.92	—	—	6,096.58	—	—
1a	"	"	104	12.80	—	—	7,697.83	4,216.58	3,481.25
8a	"	"	61	14.10	—	—	8,127.53	4,432.96	3,694.57
2a	"	"	127	18.65	—	—	6,594.50	2,871.55	3,712.95
2a	Austria	"	24	18.98	1,482.86	624.90	2,107.76	121.15	1,986.61
1a	"	"	123	25.13	1,138.90	527.25	1,666.15	95.95	1,570.20
3a	"	"	50	31.57	955.68	409.32	1,365.—	57.78	1,307.22
2a	Czechoslovakia	East	5	10.42	1,358.62	616.46	1,975.08	254.96	1,720.12
1a	"	West	30	18.78	1,291.21	609.01	1,960.22	318.48	1,641.74
1b	"	West	3	110.65	629.93	607.62	1,237.55	222.22	1,015.33
4a	Finland	North-East	26	13.83	1,122.06	351.46	1,474.42	—	—
3a	"	Centre	115	17.92	977.64	327.82	1,305.46	—	—
2a	"	South-East	54	17.99	955.53	317.14	1,272.67	—	—
5a	"	Ostrobtanie	57	18.70	832.84	277.22	1,100.06	—	—
1a	"	South	162	22.51	1,093.51	358.42	1,451.93	—	—
2b	"	Centre	4	62.14	1,101.93	313.06	1,414.99	—	—
3b	"	Ostrobtanie	5	71.43	886.29	358.14	1,224.43	—	—
1b	"	South	66	86.34	865.31	274.79	1,140.10	—	—
B. — Farms growing cereals.									
2a	England	Cambridge	24	98.—	428.63	568.71	499.34	303.86	603.48
8a	Netherlands	Friesland	312	35.40	—	—	—	—	—
13a	"	Groningen : Oldambt	16	44.60	—	—	—	—	—
16a	"	Oud-Oldambt	40	44.70	—	—	—	—	—
15a	"	Noordclifke	184	45.40	—	—	—	—	—
14a	"	Nieuw- Old.	49	55.—	—	—	—	—	—
21a	Germany	Bavaria (A)	50	14.—	—	—	—	—	—
18a	"	Centre	45	15.—	—	—	—	—	—

(1) a = peasant farms; — b = large farms.

(2) Apart from land or buildings. Rent and everything that the tenant has put into the soil and for which he is entitled to compensation if the lease is terminated.

TABLE II. Continued — Capital invested in agriculture. Values in gold franc per hectare for 1927-28,

Serial no. in Recueil (1)	Country	Region	Number of farms	Average area ha.	Farm Assets			Farm debts	Own on family capital
					Land- lord's capital	Tenant's or oper- ating capital	Total assets		
B. Continued — Farms growing cereals.									
20a	Germany	Centre: Brunswick	1	24.—	*2,441.64	876.35	3,317.99	20.89	—
23a	"	Silesia	178	28.—	—	—	—	—	—
16a	"	North (5-50 ha.)	56	30.—	—	—	—	—	—
22a	"	Bavaria B	67	37.—	—	—	—	—	—
19a	"	Centre (20-100 ha.)	162	45.—	—	—	—	—	—
24a	"	Silesia (5-50 ha.)	47	106.—	—	—	—	—	—
17a	"	North (50-200 ha.)	90	118.—	—	—	—	—	—
5b	"	Centre	52	167.—	—	—	—	—	—
7b	"	Silesia	30	316.—	—	—	—	—	—
4b	"	North	149	462.—	—	—	—	—	—
6b	"	Centre (Brunswick)	1	949.75	983.74	206.01	1,189.75	104.33	—
4a	Austria	All parts	101	19.51	1,438.63	695.24	2,133.87	73.03	2,060.8
3a	Hungary	North	19	10.66	1,566.60	379.82	1,946.42	—	—
2a	"	Transdanubian	43	14.64	2,145.—	493.30	2,638.30	—	—
1a	"	Great Plain	42	19.04	2,135.55	428.67	2,564.22	—	—
3b	"	North	8	299.17	1,413.73	289.99	1,703.72	—	—
1b	"	Great Plain	10	313.34	2,097.72	323.09	2,420.81	—	—
2b	"	Transdanubian	11	349.41	1,702.14	310.48	2,012.62	—	—
7b	"	North	10	1,557.14	1,451.55	318.30	1,769.91	—	—
5b	"	Great Plain	18	1,951.32	1,651.71	297.87	1,949.58	—	—
6b	"	Transdanubian	25	2,305.45	1,424.04	274.27	1,699.21	—	—
2a	Rumania	Bucharest	3	7.30	1,945.77	597.19	2,542.96	175.67	2,367.29
3a	"	Dobrudja	30	9.40	902.50	264.69	1,167.19	35.47	1,131.72
C. — Farms growing potatoes.									
28a	Germany	North	16	117.—	—	—	—	—	—
9b	"	North	27	350.—	—	—	—	—	—
12b	"	Silesia	39	375.—	—	—	—	—	—
10b	"	North	41	601.—	—	—	—	—	—
11b	"	Eastern Prussia	25	606.—	—	—	—	—	—
D. — Farms growing sugarbeet.									
25a	Germany	Centre	30	17.—	—	—	—	—	—
26a	"	Centre	77	58.—	—	—	—	—	—
27a	"	Brunswick	1	128.—	14,05.60	660.44	2,066.04	69.93	—
8b	"	Centre	51	219.—	—	—	—	—	—
6a	Czechoslovakia	East	19	13.13	1,259.11	656.90	1,916.01	364.26	1,551.75
5a	"	West	45	19.09	2,354.87	1,099.44	3,454.31	465.39	2,988.92
5b	"	East	8	91.40	636.99	452.30	1,089.29	737.69	351.60
4b	"	West	5	119.45	1,931.50	871.05	2,802.55	395.33	2,407.22

(1) a = Peasant farms; b = Large farms.

(2) A part from lands and buildings. Rent and everything that the tenant puts into the soil and for which he is entitled to compensation if the lease is terminated.

TABLE III. — *Gross Return - Values in gold francs*

Serial no. in Recueil	Country	Region	Number of farms	Average area ha.	Horses	Cattle	Pigs
A. — <i>Grassland, forage</i>							
2b	England	Leeds	22	159.72	—	—	—
2a	Germany	Bavaria	50	13—	—	—	—
4a	"	"	108	14—	—	—	—
10a	"	Silesia	53	22—	—	—	—
3a	"	Bavaria	30	28—	—	—	—
4a	"	North	49	30—	—	—	—
9a	"	Prussia East	45	33—	—	—	—
11a	"	North-West (North)	29	34—	—	—	—
5a	"	Bavaria	105	41—	—	—	—
8a	"	Centre	63	46—	—	—	—
12a	"	North-West (West)	80	66—	—	—	—
7a	"	North	40	91—	—	—	—
1a	"	Brunswick (1)	1	125.50	—	—	—
3a	Switzerland	All parts	36	8.91	0.18	491.65	84.97
6a	"	"	47	9.71	1.24	596.47	115.11
4a	"	"	48	10.92	0.17	476.16	80.16
1a	"	"	104	12.60	0.33	771.29	95.04
8a	"	"	61	14.10	0.85	742.10	98.13
2a	"	"	127	18.65	5.09	645.53	165.46
2a	Austria	"	24	18.98	11.96	202.05	50.55
1a	"	"	123	25.13	6.78	134.82	71.81
3a	"	"	50	31.57	7.05	139.31	34.03
—	Czechoslovakia	—	—	—	—	—	—
4a	Finland	North-East	26	13.83	22.49	264.07	21.22
3a	"	Centre	115	17.92	18.38	207.20	30.18
2a	"	South-East	54	17.99	20.67	223.91	40.90
5a	"	Ostrobothnic	57	18.79	17.25	164.31	25.67
1a	"	South	162	22.51	14.61	227.75	37.17
2b	"	Centre	4	62.14	6.50	264.41	17.89
3b	"	Ostrobothnic	5	71.43	13.71	216.73	41.93
1b	"	South	66	86.34	10.66	178.85	24.84
B. — <i>Farms growing</i>							
2a	England	Cambridge	24	93—	—	—	—
8a	Netherlands	Friesland	312	35.40	—	—	—
13a	"	Groningen : Oldambt	16	44.60	—	101.33	—
16a	"	Oud-Oldambt	40	44.70	—	106.65	—
15a	"	Noordelijke	184	45.40	—	164.61	—

(1) The results for Brunswick are included in those for the groups of Central Germany. — a) = peasant farms. — b) = large

per hectare for years 1927-28.

Sheep and goats	Poultry	Other stock	Cereals	Root crops	Other field crops	Vine growing	Arbori- culture	Forests	Misc. branches	Total	Serial no. in Recueil
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crops and stock farms.

—	—	—	—	—	—	—	—	—	—	—	2b
—	—	—	—	—	—	—	—	—	—	528.16	2a
—	—	—	—	—	—	—	—	—	—	502.08	4a
—	—	—	—	—	—	—	—	—	—	437.87	10a
—	—	—	—	—	—	—	—	—	—	420.55	3a
—	—	—	—	—	—	—	—	—	—	387.16	6a
—	—	—	—	—	—	—	—	—	—	316.05	9a
—	—	—	—	—	—	—	—	—	—	500.95	11a
—	—	—	—	—	—	—	—	—	—	465.08	5a
—	—	—	—	—	—	—	—	—	—	515.80	8a
—	—	—	—	—	—	—	—	—	—	530.30	12a
—	—	—	—	—	—	—	—	—	—	30.87	7a
—	—	—	—	—	—	—	—	—	—	—	1a
32.02	0.74	17.28	20.07	31.94	—	61.74	24.66	24.81	188.42	978.48	3a
0.26	6.01	7.03	56.91	40.06	—	9.00	90.53	47.87	148.84	1,119.93	6a
18.25	0.91	9.59	10.92	19.37	—	1.62	11.79	34.33	120.11	792.38	4a
3.05	2.18	9.35	2.45	8.33	—	10.53	111.20	35.53	176.12	1,225.40	1a
0.63	5.73	8.63	39.53	32.86	—	0.34	122.60	40.16	175.08	1,267.29	8a
0.84	9.05	3.14	92.38	50 —	—	2.31	54.40	49.79	147.04	1,225.60	2a
—	1.82	—	28.03	9.32	—	—	3.51	20.57	66.19	394.60	2a
0.18	7.43	—	44.62	1.43	—	—	23.33	18.32	56.77	365.49	1a
—	0.15	—	14.57	2.85	—	—	2.26	27.16	37.96	265.36	3a
—	—	—	—	—	—	—	—	—	—	—	—
9.78	6.34	4.03	29.29	23 —	18.94	—	—	—	34.51	437.67	4a
6.14	5.35	1.64	47.45	17.55	18.81	—	—	—	26.56	379.26	3a
5.94	10.42	0.75	48.21	20.80	36.12	—	—	—	21.65	431.37	2a
2.72	6.87	0.06	47.43	13.37	15.25	—	—	—	17.08	310.01	5a
2.74	14.14	0.37	61.61	26.58	19.45	—	—	—	25.51	429.93	1a
2.77	3.68	0.57	40.42	8.45	0.34	—	—	—	28.38	382.41	2b
2.20	1.02	—	23.06	5.87	11.42	—	—	—	9.82	325.81	3b
0.97	5.90	0.02	53.61	19.25	14.12	—	—	—	17.16	325.38	1b

cereals.

—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	8a
—	—	—	409.60	36.91	157.20	—	—	—	31.16	736.20	13a
—	—	—	382.05	90.60	122.06	—	—	—	33.93	744.29	16a
—	—	—	380.34	88.23	217.18	—	—	—	28.64	879 —	15a

farms.

TABLE III. *Continued* — Gross Return - Values in gold francs

Serial no. in Recueil	Country	Region	Number of farms	Average area ha.	Horses	Cattle	Pigs
14a	Netherlands	Groningen: Nicuw-Old.	40	55—	—	69.61	—
21a	Germany	Bavaria A	50	14—	—	—	—
18a	"	Centre	45	15—	—	—	—
20a	"	Brunswick (1)	1	24—	—	—	—
23a	"	Silesia	178	28—	—	—	—
16a	"	North	56	30—	—	—	—
22a	"	Bavaria B	67	37—	—	—	—
19a	"	Centre	162	45—	—	—	—
24a	"	Silesia	47	105—	—	—	—
17a	"	North	90	118—	—	—	—
5b	"	Centre	52	167—	—	—	—
7b	"	Silesia	30	316—	—	—	—
4b	"	North	149	462—	—	—	—
6b	"	Brunswick (1)	1	948.75	—	—	—
4a	Austria	All parts	101	19.51	5.18	161.32	90.73
3a	Hungary	North	19	10.66	—	—	—
2a	"	Transdanubia	43	14.64	—	—	—
1a	"	Great Plain	42	19.04	—	—	—
3b	"	North	8	200.17	—	—	—
1b	"	Great Plain	10	313.34	—	—	—
2b	"	Transdanubia	11	349.41	—	—	—
IIIb	"	North	10	1,557.14	—	—	—
Ib	"	Great Plain	18	1,951.32	—	—	—
IIb	"	Transdanubia	25	2,305.95	—	—	—
2a	Rumania	Bucarest	3	7.30	73.62	232.20	31.18
3a	"	Dobrudja	30	9.40	—	11.64	17.08

C. — Farms

28a	Germany	North	16	117—	—	—	—
9b	"	North	27	350—	—	—	—
12b	"	Silesia	39	375—	—	—	—
10b	"	North	41	601—	—	—	—
11b	"	Eastern Prussia	25	600—	—	—	—

D. — Farms

25a	Germany	Centre	30	17—	—	—	—
26a	"	Centre	77	58—	—	—	—
27a	"	Brunswick (1)	1	128—	—	—	—
8b	"	Centre	51	210—	—	—	—
—	Czechoslovakia	—	—	—	—	—	—

(1) The results for Brunswick are included in those for the groups of Central Germany. — a) = peasant farms. — b) = large

per hectare for years 1927-28 (concluded).

Sheep	Poultry	Other stock	Cereals	Root crops	Other field crops	Vine growing	Arboriculture	Forests	Misc. branches	Total	Serial no. in Recueil
—	—	—	390.38	28.85	205.10	—	—	—	27.29	721.23	14a
—	—	—	—	—	—	—	—	—	—	535.59	21a
—	—	—	—	—	—	—	—	—	—	669.17	18a
—	—	—	—	—	—	—	—	—	—	—	20a
—	—	—	—	—	—	—	—	—	—	637.01	23a
—	—	—	—	—	—	—	—	—	—	413.13	16a
—	—	—	—	—	—	—	—	—	—	518.27	22a
—	—	—	—	—	—	—	—	—	—	696.39	19a
—	—	—	—	—	—	—	—	—	—	654.33	24a
—	—	—	—	—	—	—	—	—	—	452.71	17a
—	—	—	—	—	—	—	—	—	—	753.28	5b
—	—	—	—	—	—	—	—	—	—	604.85	7b
—	—	—	—	—	—	—	—	—	—	440.34	4b
—	—	—	—	—	—	—	—	—	—	—	6b
0.20	13.60	—	88.83	19.13	—	4.51	14.89	8.09	79.59	486.07	4a
—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	176.48	3b
—	—	—	—	—	—	—	—	—	—	229.82	1b
—	—	—	—	—	—	—	—	—	—	204.78	2b
—	—	—	—	—	—	—	—	—	—	371.72	7b
—	—	—	—	—	—	—	—	—	—	235.14	5b
—	—	—	—	—	—	—	—	—	—	220.58	6b
61.06	14.29	—	117.36	—	—	0.50	—	—	—	537 —	2a
23.56	12.91	—	121.72	—	30.00	8.95	—	1.35	9.52	245.84	3a

growing potatoes.

—	—	—	—	—	—	—	—	—	—	471.27	28a
—	—	—	—	—	—	—	—	—	—	509.61	9b
—	—	—	—	—	—	—	—	—	—	674.12	12b
—	—	—	—	—	—	—	—	—	—	481.16	10b
—	—	—	—	—	—	—	—	—	—	380.97	11b

growing sugar beet.

—	—	—	—	—	—	—	—	—	—	942.53	25a
—	—	—	—	—	—	—	—	—	—	915.32	26a
—	—	—	—	—	—	—	—	—	—	—	27a
—	—	—	—	—	—	—	—	—	—	946.24	8b
—	—	—	—	—	—	—	—	—	—	—	—

farms.

TABLE IV. — *Production costs. Values in gold francs per hectare for years 1927-28.*

Serial no. in Recueil	Country	Region	Number of farms	Average area ha.	Labour	Current Farm Ex- penses	Amor- tisa- tions	Total farm expenses	Interest on capital	Production costs
A. — Farms mainly engaged in animal production.										
1b	England	Leeds	22	150.72	—	—	—	—	—	—
2a	Germany	Bavaria A	50	13.—	312.94	228.82	28.45	570.21	—	—
4a	"	"	108	14.—	294.38	226.35	32.16	552.89	—	—
10a	"	Silesia	53	22.—	246.15	158.32	10.70	424.26	—	—
3a	"	Bavaria B	30	28.—	200.99	175.64	25.98	402.61	—	—
6a	"	North (5-50 ha.)	49	30.—	218.94	179.35	22.26	420.55	—	—
9a	"	Eastern Prussia	45	33.—	166.99	108.84	23.50	299.33	—	—
11a	"	North-West (N.)	29	34.—	196.67	306.75	10.79	523.21	—	—
5a	"	Bavaria B	165	41.—	232.54	192.95	28.45	453.94	—	—
8a	"	Centre	63	46.—	244.91	243.67	23.50	512.08	—	—
12a	"	North-West (West)	80	66.—	201.61	324.08	18.55	544.24	—	—
5a	"	North (50-200 ha.)	40	91.—	197.90	183.07	18.55	390.52	—	—
1a	"	Centre (Brunswick)	1	125.50	—	—	—	—	—	—
7a	Switzerland	All parts	36	8.91	684.12	212.55	153.85	1,050.52	387.30	1,437.82
6a	"	"	47	9.71	603.07	328.44	155.58	1,087.09	321.17	1,408.26
4a	"	"	48	10.92	524.99	205.29	108.10	838.38	318.33	1,156.71
1a	"	"	104	12.80	561.46	365.44	162.50	1,089.40	367.84	1,457.24
8a	"	"	61	14.10	584.83	352.40	187.21	1,124.44	379.89	1,504.33
2a	"	"	127	18.65	546.37	369.82	144.78	1,059.97	335.62	1,395.59
2a	Austria	"	24	18.98	203.70	84.60	21.71	310.01	—	—
1a	"	"	123	25.13	194.72	86.27	16.57	297.56	—	—
3a	"	"	50	31.57	150.04	58.65	8.48	217.17	—	—
4a	Finland	North-East	26	13.83	234.11	110.57	21.83	366.51	124.99	491.50
3a	"	Centre	115	17.92	227.42	109.22	19.57	356.21	111.—	467.21
2a	"	South-East	54	17.99	212.65	117.95	19.47	350.07	108.17	458.24
5a	"	Ostrobothnie	57	18.79	156.93	87.10	11.76	255.79	98.36	354.15
1a	"	South	162	22.51	182.48	130.75	21.30	334.53	123.32	457.85
2b	"	Centre	4	62.14	195.26	156.19	20.56	372.01	119.46	491.47
3b	"	Ostrobothnie	5	71.43	137.30	135.71	17.92	290.03	105.11	395.14
1b	"	South	66	86.34	138.32	117.—	18.24	273.56	96.71	370.27
B. — Farms engaged in cereal growing.										
2a	England	Cambridge	24	93.—	245.36	—	—	—	96.74	—
8a	Netherlands	Friesland	312	35.40	—	—	—	—	—	—
13a	"	Groningen (Oldambt)	16	44.60	268.03	279.82	—	547.85	331.95	879.80
16a	"	Oud Oldambt	40	44.70	292.31	300.99	—	593.30	329.11	922.41
15u	"	Noordelijke	184	45.50	337.90	293.61	—	631.21	376.71	1,007.92
21a	"	Nieuw Oldambt	49	55.—	294.—	256.55	—	550.55	370.02	920.57
18a	Germany	Bavaria A	50	14.—	269.65	226.35	32.16	528.16	—	—

a) = Peasant farms.

b = Large farms.

TABLE IV *Continued.* — *Production costs. Values in gold francs per hectare for years 1927-28*

Serial no. in Recueil	Country	Region	Number of farms	Average area ha.	Labour	Current Farm Ex- penses	Amor- tisa- tions	Total farm expenses	Interest on capital	Produc- tion costs
B. <i>Continued.</i> — <i>Farms engaged in cereal growing.</i>										
18a	Germany	Centre (5 to 20 ha.)	45	15.—	295.63	277.06	34.63	607.32	—	—
20a	"	Centre (Brunswick)	1	24.—	—	—	—	—	—	—
23a	"	Silesia (5 to 50 ha.)	178	28.—	285.73	243.06	28.45	557.84	—	—
16a	"	North (5 to 50 ha.)	56	30.—	230.07	184.31	24.74	439.12	—	—
22a	"	Bavaria B.	67	37.—	237.49	221.41	28.45	487.35	—	—
19a	"	Centre (20 to 100 ha.)	162	45.—	305.52	319.11	32.16	656.70	—	—
24a	"	Silesia (50 to 200 ha.)	47	106.—	269.65	301.81	28.45	599.91	—	—
17a	"	North (50 to 200 ha.)	90	118.—	233.78	231.31	21.03	486.12	—	—
5b	"	Centre	52	167.—	330.26	369.84	33.40	733.50	—	—
7b	"	Silesia	30	316.—	269.65	300.22	24.74	603.61	—	—
4b	"	North	149	462.—	228.83	220.18	21.03	470.04	—	—
6b	"	Centre (Brunswick)	1	948.75	—	—	—	—	—	—
4a	Austria	All parts	101	19.51	230.19	126.55	26.10	382.84	—	—
3a	Hungary	North	19	10.66	—	—	—	—	—	—
2a	"	Transdanubia	43	14.64	—	—	—	—	—	—
1a	"	Great Plain	42	19.04	—	—	—	—	—	—
3b	"	North	8	299.17	—	—	—	145.06	—	—
1b	"	Great Plain	10	313.34	—	—	—	205.33	—	—
2b	"	Transdanubia	11	349.41	—	—	—	191.34	—	—
7b	"	North	10	1,157.14	—	—	—	303.95	—	—
5b	"	Great Plain	18	1,951.32	—	—	—	225.77	—	—
6b	"	Transdanubia	25	2,305.45	—	—	—	198.36	—	—
2a	Rumania	Bucarest	3	7.30	142.43	142.35	17.32	302.10	301.74	603.84
1a	"	Dobrudja	30	9.40	85.09	54.15	10.09	149.33	136.55	285.88
C. — <i>Farms growing potatoes.</i>										
28a	Germany	North	16	117.—	238.72	260.98	19.79	519.49	—	—
9b	"	"	27	350.—	231.30	246.15	22.26	499.71	—	—
12b	"	Silesia	39	375.—	265.94	357.46	28.45	651.85	—	—
10b	"	North	41	601.—	221.41	264.71	23.50	509.62	—	—
11b	"	Eastern Prussia	25	606.—	170.69	173.18	23.50	367.37	—	—
D. — <i>Farms growing sugar beet.</i>										
25a	Germany	Centre (5 to 20 ha.)	30	17.—	324.08	424.27	49.48	797.83	—	—
26a	"	Centre (20 to 100 ha.)	77	58.—	348.81	430.45	38.34	817.60	—	—
27a	"	Centre (Brunswick)	1	128.—	—	—	—	—	—	—
8b	"	Centre	51	219.—	372.31	451.58	34.63	858.42	—	—

a) = Peasant farms.

b) = Large farms.

In Part II of this study, it is proposed to make a further comparison of the gross returns, farm expenses and financial results in the different countries which have supplied material for the first Recueil.

(to be continued)

J. DESLARZES.

The Agricultural Crisis in France and its effects on the Peasant Class.

France is among the countries in which the proportion of the peasant class to the total farming population is very high and where this class has been established over a long period. Hence it is natural to turn to France when it is desired to ascertain the effects of the agricultural crisis on the peasant.

According to the agricultural enquiry made in 1892 farms were grouped as follows numerically : small and very small holdings 85 per cent., medium sized farms, 12 per cent., and large and very large farms 3 per cent. In respect of area, the proportions were 26 per cent. for the small holdings, 30 per cent. for the medium sized farms and 43 per cent. for the large farms. The methods followed in this enquiry were however over-simplified and the procedure somewhat uncertain in character, and accordingly it was of no great value, although it is not implied that the results are in any way improbable. On the contrary they are confirmed by other more recent researches.

An enquiry made in 1926 relating only to vine growing farms has given the following results :

	Number	Area (hectares)
less than one hectare	1,089,059	382,250
from one to five ha.	323,446	627,137
from 5 to 50 ha.	37,254	376,902
more than 50 ha.	877	68,982

The 79,970 members of the dairy societies of Charentes and Poitou in 1924 possessed in all 216,118 cows, a fact showing that the greater number of them have only one cow, or at most two or three cows, and that they are accordingly peasant farmers.

The last population census of which detailed results are available, *viz.*, that of 1926, shows that there has been a decline of nearly 10 per cent. in the number of farm workers since 1921, but is also proof that the proportion of master farmers to labourers which is so characteristic of French agriculture is maintained. Not counting women there were 2,452,777 master farmers and 585,912 "isolated", that is to say, independent workers, probably not wage earners or persons whose wage is only a part of their remuneration. As compared with these three million farmers

who for the most part constitute the French peasant class, there were only 1,702,972 workers or employees.

The population census of 1926 has supplied another piece of characteristic information ; the classification of farms according to the number of wage-earners employed by them. The returns show 1,327,319 farms on which there is no wage earner permanently employed, 1,151,221 farms employing from one to five wage earners, 35,891 farms which employ from 6 to 50, and only 2,292 which have more than 50 wage-earning workers. As there are usually classed among the peasant farms, small or medium-sized, those which employ less than five or at most five workers, it is clear that in France it is the peasant class which is dominant, and is thus a typical object of study in connection with the problem before us.

* * *

It has often been stated in the past that the peasant farm better resists economic crises than the large capitalist undertaking. The arguments on which this statement is founded are as follows : the peasant works for himself, for the needs of his family and not for the market : since he does the farm work himself or with the help of his family, the rise in wages does not affect him ; he buys few implements and employs as fertiliser the farm manure ; he repairs his tools and his buildings himself, and when the season is bad, he reduces his standard of living.

It may be remarked that all this does not mean that the peasant does not suffer from the crises : he suffers on the contrary quite directly because he is obliged to curtail his food, if he still intends to take anything to the market to pay his debts, his rent, or taxes, or to cover urgent necessary expenditure ; he buys no new clothing ; he denies himself all pleasures. His resistance to the crisis is measured by his capacity for suffering and for endurance.

But this portrait of the French peasant is old-fashioned. It does not represent the young peasant of to-day ; it is the portrait of his grandfather. Economic and technical conditions of agriculture were greatly changed even in the second half of the XIXth century, more quickly at the beginning of the XXth and still more quickly since the war.

Nearly all cultivators now buy and sell more than formerly. They purchase their equipment and their chemical fertilisers ; they call in skilled workmen to repair their buildings ; they buy their clothing and even a good part of the more varied foodstuffs consumed ; the taxes that have to be paid are higher, and so is the expenditure for instruction or amusements. It is thus essential for them to sell, and they depend more on the market. They are seriously hit by the fall in selling prices and the rise in all expenses. It is no longer even true to say that they do not pay wages, since their children from the time they begin to work with any appreciable output demand a money wage as well as their board and their clothing. It is probably an outworn dictum that the peasant resists crises well.

* * *

The question as it can be put to-day must be modified ; it is rather whether the peasant farm is more resistant than the large industrial or capitalised undertaking. In the absence of any documents it is impossible to reply with any certainty.

No doubt the peasant might say as in La Fontaine's fable: I bend, I do not break. The large farmer breaks under the onset of the crisis because he keeps accounts, he measures his losses, the banker refuses him fresh credits, so that before coming to total ruin he gives up the game, sells his property or transfers his farm. The small peasant farmer does not keep accounts. (Some few are beginning to apply to Farm accountancy offices which will prepare the balance sheet they do not know how to undertake and will inform them of their position). His courage springs from ignorance of the danger. He is resigned because he is unaware that the reasons for hoping are less strong than they were, because he thinks that the crisis will be temporary and that one good harvest will be enough to repair his losses. He believes also that good laws are all that are needed to restore the situation. Often he goes on without too much reflection, from habit, from tradition, as his father and his ancestors have done.

It is impossible to tell him that he is mistaken. No one is in a position to say that the crisis will be prolonged or that it will be shortly surmounted, and it is quite possible that the peasant will stand to gain by this staying power. His best friends would hesitate to advise him to give up a losing game; true, it may seem difficult to win, but it is far from being lost.

In particular in France where the agricultural crisis has come about later and in a less severe form than in other countries, it is too soon to measure afresh the capacity for resistance of the peasant class. All that is possible is to examine the conditions in which the peasants meet the menace of the crisis.

* * *

In a more exact and more fully elaborated study of the subject a distinction should be made between the different most characteristic types of peasant farms. The most widespread type to which these observations principally apply is the farm holding of from 5 to 20 hectares, cultivated by the peasant family, where one "does a little of everything", according to the possibilities of the climate, cereals, beetroot or potatoes, cattle, sheep or pig farming, poultry and rabbit keeping, manufacture of dairy products, butter and cheese, market garden produce and fruit for family consumption or for the market. Many combinations of this type may be found according to the regions, qualities of the soil, the legal character of the tenure, whether ownership, tenancy or produce-sharing tenancy. To obtain exact information the only way would be to proceed to a methodical enquiry similar to that effected so successfully in Italy by Prof. G. Tassinari the results of which have just been published under the title *La distribuzione del reddito nell'agricoltura italiana*. This would require documentation which only exists in France in a fragmentary form, and is largely out of date. It is anticipated however that the comprehensive agricultural enquiry now in progress will supply the missing information.

To give some idea of the variations in types which do not admit of easy reduction to an over-simplified general form, it may be recalled that side by side with these mixed farms following the ancient tradition, there has been established in the course of the last fifty years; holdings farmed with some special commercial object or even undertakings devoted to single-crop cultivation. An instance which occurs readily to the mind consists of the vineyards in the South of France. In the great vine — growing region it is the practice of the growers to reserve all their available land for vines so that they are obliged to purchase even feed for their horses or mules at a distance. The extent of the peasant farm does not exceed 20 hectares, for a

property that can produce from 1,500 to 2,000 hectolitres of wine belongs to the class of medium — sized farms where the annual turnover of capital is already considerable.

There will be found also in the South of France other types of specialised farms, those on which market gardening or fruit growing is carried on. If situated on good alluvial soil and irrigated, from two to three hectares are enough, sometimes even one hectare only, to give continuous work and to ensure a livelihood to a family of three or four persons.

In the regions where the main occupation is the breeding of cattle, whether for meat or for milk, a number of types of undertakings must be distinguished according to the quality of the grazing lands, ranging from rough mountain pasturage on which the sickle is never employed to good grasslands cut for hay several times a year or rich meadow herbage where the fattening of store cattle is carried on.

When the peasant finds regular occupation in the forest, an influence is naturally exercised on the methods of work and the economic organisation of the peasant holding. It is unnecessary to multiply instances ; it is easy to see that the types of peasant farming vary as much as do those of the French population itself where so many races and nationalities have been intermingled and blent in the course of history.

These ethnic and moral influences must in fact be recognised in a study which aims at completeness. In the resistance which the peasant holdings can put up against the present economic difficulties the character of the peasants is by no means a negligible factor. They do not all possess the same energy, the same capacity for resignation, for intelligent action or for fresh departures, nor the same readiness to unite and to organise themselves.

This great variety of situations cannot be fully treated in a short article, and hence these general observations cannot but lose some of their conviction and interest.

* * *

The weak points in the defences of peasant holdings in the event of economic crises may be stated something as follows.

It often happens that the peasant holding which has been formed partly of plots acquired by inheritance or as dowry, partly by purchase of parcels is composed of a considerable number of small pieces of land which are badly shaped, scattered and lying at distances from each other. This is especially striking in regions where the dwelling houses and other buildings are grouped in villages and not situated in the midst of the cropped lands. Apart from documentary evidence which is completely lacking it would seem that nearly one half of the peasant farm holdings in France are too much sub-divided.

The farm equipment, taking the term in its most general sense, is often insufficient and out of date, in spite of the very real progress that has been made in this respect before and in particular after the war. The dwelling houses are inconvenient ; the buildings that are used to store the crop products and to shelter the animals are too small and badly arranged.

The technical instruction is fairly good. The French peasants know their work. But the farming profession is one that must be always developing in relation to the constant advances of science. The peasant farmer is somewhat too slow in following the changes which it has become necessary to introduce into the traditional practices. They err on the side of timidity and hesitation, rather than on that of rash or ill-considered action. The use of chemical fertilisers in particular appears to be less developed than it might be.

Economic instruction is usually inadequate. As a whole the French peasant farmers seem better growers than they are salesmen. They have not yet learnt to present their products according to those methods of standardisation, classification, grouping and joint sale which are necessary for obtaining the better prices on the large markets.

In addition the whole of their economic organisation is defective. During the period of agricultural restoration after the war, they bought the land too dear which the town population offered for sale and in many regions they agreed to pay rents that were too high. In consequence they are without the working capital which they should have for bridging over difficult moments. The mortgage debt which the monetary inflation had made so easy to repay has once more become considerable, although the actual figure attained to-day cannot be stated.

It is not possible to estimate with any accuracy the grounds for anticipating inadequate resistance on the part of the peasant farm in view of the crisis, especially as these weak points in the defence are compensated by forces and means of resistance that must now be considered.

In the first place there are moral forces. No doubt the number is large of those peasants who have left the fields to go into factories, commercial firms and public offices where they expect to find an easier life and a more generous remuneration. This does not constitute a sign of prosperity. From 1921 to 1926 the total number of workers in agriculture, including forests, declined by 821,275 or nearly 10 per cent., while the numbers employed in mines and factories increased by 615,735 and in trade by 195,163. Those who remained on the farms have however lost none of their zeal for work, and their powers of application and capacity for prolonged work will enable them to resist the crisis.

It has already been remarked that they cannot reduce maintenance expenses as they used formerly to do. Equally with other workers, public employees and town dwellers, they feel that a marked reduction in the standard of living already reached is a sign of failure. Personal expenditure that could be done without twenty years ago has become necessary to them. This does not mean that under pressure of necessity they are no longer capable of self restraint. In any case there is a type of expenditure, repairs to buildings, upkeep, purchase of fertilisers, which may be reduced or postponed. It is undoubtedly by such means that the peasants will endeavour to meet the diminished receipts which are the consequence of the crisis.

Although it has been admitted that there may be classed as peasant farms the holdings that employ up to five wage earning workers (these being medium-sized holdings) the most frequent type of peasant holding is that based on the labour of all the members of the family rather than on the utilisation of paid labour. It is here that there lies the possibility of resistance, *i. e.*, by restriction of expenditure, which gives to the peasant class an indisputable advantage over the large capitalist undertaking.

These personal, individual forces of resistance which depend on human courage are reinforced by all the means of resistance which have been built up through association and by the law.

Returning to the list of what have been called the weak points in the peasant defences, the methods of correcting and strengthening the points where there were signs of yielding may now be illustrated.

The effects of excessive subdivision are counterbalanced by the rural exodus. Those who move to the town usually sell their property, which is bought by the neighbours to enlarge and round off their cultivated fields. In the absence

of actual reparcelling operations of which instances might be given but which on account of the difficulty of carrying them through satisfactorily are less numerous, exchanges of parcels are made and encouraged by fiscal legislation.

The technical equipment, buildings, etc. are not so good as might be wished but are improved by co-operation. There are no examples in France of cultivation of lands by owners or land workers in association. The peasant has pride in his own calling and considers his work as a personal affair which each does as best he can.

The transformation of crop products into products prepared for the market is however increasingly a matter for joint undertaking. The manufacture of butter and cheese, the production of wines and of beet products have completely changed character owing to the formation of small local co-operative societies the number of which is increasing every day as the result of the long term loans made by the *Crédit Agricole* (See *International Review of Agriculture*, November, 1930, p. 366, the article on Co-operative Wine-making in France). The societies set up federations and also depots which do much to improve marketing conditions.

For wheat growing, mention may be made of the co-operative threshing societies and threshing syndicates which the peasant farmers find more advantageous than any use of the services of contractors. According to a statement recently made, in three departments in which small peasant ownership prevails there are 208 threshing societies. In 1930 these societies gave 9,936 days' work for 11,900 co-operators. The number of days in relation to the number of co-operators is proof that the work is done for the benefit of small farmers whose crop in most cases could be dealt with by the thresher in one day or less.

There is also a development of co-operative elevators for the storage of grain, making it possible to organise regular supplies on the market. When these are more numerous they will act as a check on the rush of offers immediately following the harvest, which result in a price fall of which the peasant who is obliged to sell is the victim.

In a time of crisis it is impossible to consider improvements in buildings. It should be noted that the electrification of the rural areas has made rapid progress in the course of the last few years, and that it is carried out by means of State subsidies and advances. The result has been that not only do the peasants enjoy the much appreciated advantage of better lighting, but also the possibility of utilising labour-saving equipment in the farmhouse and buildings. In many cases also a supply of drinking water has been or will be laid on by the Rural Engineering Department. The result will be an advance in the general health and hygienic conditions of the rural workers with consequent improvement in conditions of labour.

Considerable advance has been made in both general and technical education. The syllabus of work in the primary school has been transformed so that it forms a preparation for the farming occupation. Post-school courses, instruction by correspondence, lessons in household instruction for girls are organised, either by the Departments of Agriculture and Public Instruction or by the agricultural associations.

For a long time past the co-operative supply associations have developed a larger and more judicious employment of chemical fertilisers. This year a perceptible reduction has been noted in the purchases of fertiliser in the agricultural co-operative societies. It is the direct result of the crisis and the proof that the purchasing power of the peasants is already reduced. If this involves a reduction in cropping it may be concluded that the crisis is itself acting automatically against over-production.

It is unnecessary to recall here that the institution of agricultural credit has been

functioning in France for more than 30 years. In special cases agricultural credit reinforces the power of resisting the crisis. But its effect is clearly limited. The appeal to credit in a period of crisis of which neither the gravity nor the duration can be foreseen involves risks which it is unnecessary to emphasise.

Finally legislation intervenes with an effect which is somewhat variable to protect the peasant farmers in the economic danger which they have to face, and in the first instance by the raising of tariff barriers. It is well known that in consequence of the customs duties, wheat is sold at this moment in France at three times the world price. This fact presumes no doubt on the part of consumers an effort of solidarity which cannot be indefinitely prolonged, but which can quite legitimately be called into requisition. France protects her peasant farmers, and returns to them only what she has obtained from them, since it is they who defended France with a heroic devotion. The detail of the measures which have been adopted by the French legislation will be found in Document No. 2 of the recent World Wheat Conference held in Rome on 26 March. Similar provisions have been taken in favour of other products, meat, dairy produce, sugar beet, etc. These measures have been up to now efficacious.

It is on this account that it is still too soon to say what is the resistance of the French peasant farming class to the crisis. Undoubtedly the crisis is already felt. The complaints of the growers, the obvious diminution of their purchasing power, the intensification of the rural exodus is proof that the peasant class is involved in the struggle and are suffering under it. Up to now they have put up a good defence both of themselves and thanks to the help they have had. It is only in the event of the crisis being prolonged that it will be possible to judge of the strength of the resistance of the peasant farmer.

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CO-OPERATION

Agricultural Co-operation in Czechoslovakia

(Continued)

E. -- CO-OPERATIVE SOCIETIES FOR THE PURCHASE OF FARM REQUISITES AND THE SALE OF AGRICULTURAL PRODUCTS.

The origin of agricultural co-operative trading dates back to the time when the Kampelík banks began to organise co-operative agricultural credit. In addition to credit, they undertook, also, as has already been stated, the purchase of agricultural requisites, mainly the purchase of fertilisers, lime, coal and benzine. At the same time as the first Kampelík banks were formed, special co-operative agricultural trading establishments made their appearance. These were constructed on a large scale, and were intended to concentrate the trade in agricultural products so as to influence the market. It proved impossible to carry this programme into effect, or to fix the method of paying the farmers who supplied cereals, as they preferred to sell their wheat to grain merchants at fixed prices. Hence it followed that these first co-operative warehousing schemes could not last long, and that by the end of last century they had almost completely disappeared. At the beginning of the twentieth century the co-operative societies for purchase and sale began to be form-

ed on sounder bases, relying on the co-operative credit societies and their Federations, which at that time were already much developed. These new agricultural trading societies became increasingly vigorous; they did not however succeed in concentrating the trade in cereals and thus could not become an important factor in the formation of cereal prices. They undertook during the war the official purchase of cereals, a fact which much contributed to the development of their organisation and increase in the number of societies. Constituted thus solidly they entered on the new post-war conditions, and they were able successfully to undertake the part allotted to them after the termination of hostilities of provisioning the population and thereby replacing the control system. When in 1922 freedom of trading was re-established, the business done by them in connection with the cereal trade, which up to then they had dominated, declined considerably. None the less, several of them were able to keep certain positions already attained so that at the present time the co-operative societies for purchase and sale play an important part in the sale of cereals in Czechoslovakia. There are even some regions where the farmers sell their wheat exclusively to the co-operative societies, and where the grain merchants have completely disappeared. Accordingly Czechoslovakian agricultural co-operation is rendering increasingly important services to the cereal trade, and it is possible to foresee a time when it will attain the end envisaged and centralise in its own hands the cereal trade of the whole country.

The co-operative warehousing societies sell, besides cereals, other products supplied by their members, especially potatoes, beans, oil seeds, etc. Although the sale of agricultural products already represents an important part of their trading affairs, it is the purchase of farm requisites which is the main object of the co-operative societies of this type. They supply farmers at low rates with seeds, forage, fertilisers, coal, lime, cement, even farm machines. Agricultural co-operation already plays an important part in the importing of some kinds of commodities, especially in that of fertiliser, where it takes a leading position, in the importation of forage, and especially in that of maize. The total value of the commodities sold by these societies in 1929 is almost double the value of those sold by the Central trading societies, shown in the table attached to the chapter dealing with central organisation.

In 1930, there were in Czechoslovakia 351 agricultural co-operative societies for purchase and sale, including 244 Czech, 77 German, one Polish and 29 in Slovakia and Ruthenia. Ninety per cent. of the members are farmers, mainly small peasant farmers, with land not exceeding 20 hectares. The average number of members of one of these co-operative societies is 573. The officers of the administrative organs are elected by the General Assembly, and only their actual out-of-pocket expenses are paid. The co-operative societies are managed by experts who are engaged if they have the required theoretical and practical knowledge. Any ordinary member has a right to take part in the general meeting, to vote and to enjoy all the advantages for which the constitution makes provision. He is on the other hand obliged to subscribe shares, usually equivalent to 100 Czechoslovak crowns, to guarantee in accordance with the terms of the constitution the engagements made by the society up to the value of from one to ten shares, to supply his own products to the society, and to purchase from it all the farm requisites he needs. The activity of the co-operative warehousing societies is not merely trading; they also endeavour to improve the value of products supplied by their members, by means of seed selection, the analysis of fertilisers, the manufacture of molasses cake, etc. They have at their disposal well equipped warehouses and

technical plant. The average capacity of a warehouse is 8,736 quintals. The co-operative societies for purchase and sale are also accomplishing a remarkable educational work, by propagating among farmers the best methods of agricultural technique, instructing them in the use of fertilisers, and giving them information on price formation, etc. Mention has already been made of the central organisations, with which the societies are linked. It may be added that the co-operative warehousing societies, affiliated to the Prague Central Union of Co-operative Agricultural Societies, to the number of 98, are organised within the unofficial regional Associations to act as intermediaries, when it is a question of trade, between the co-operative societies and the central organisation. Some of the warehousing societies have their own mills, bakeries, and even their machine shops and their central electric powerhouses. In addition there are in Czechoslovakia 65 independent co-operative milling and bakery societies, *viz.*, 42 Czech and 23 German societies.

The co-operative warehousing societies have suffered noticeably from the agricultural crisis, and severe losses have been registered. The fact that the co-operative societies have been obliged to make grants of fairly considerable sums to members in difficulties has made their situation particularly difficult. In spite of these exceptional conditions, the co-operative warehousing societies are generally equal to the position, owing to the support given by the central organisations, and they are endeavouring, under their supervision, to consolidate their economic bases, especially by introducing into their operations the most suitable and most scientific trading methods.

F. — FARMERS' SOCIETIES FOR THE SUPPLY OF HOUSEHOLD REQUISITES.

These co-operative societies, the object of which is primarily to supply farmers with household articles, are diffused more especially in Slovakia and Ruthenia, where there are in all 1,006. Before the war these societies were of considerable importance in these provinces, representing with the co-operative credit societies the only form of co-operative society known. They supplied the Slovakian and Ruthenian peasants not only with foodstuffs and household articles but also with farm implements, etc. In the historic countries this type of co-operative society is of little importance and there are only 105 Czech societies, 5 German and 7 Polish in these provinces making with the societies of Slovakia and Ruthenia a total of 1,123 in all.

G. — CO-OPERATIVE SALE OF LIVESTOCK.

Sales of livestock form a branch of trading which is least penetrated by the co-operative idea. Co-operative societies for the improvement and sale of livestock were highly developed and diffused particularly in Moravia and in the mountainous regions of Bohemia, but their activities were almost exclusively limited to obtaining pure bred bulls for their members and in laying out pasture. At the same time they were not without initiative in the matter of livestock sales. Four Central territorial organisations were set up for the sale of live stock; these now form part of the "Centrokoperativ". In 1924 the co-operative societies of Bohemia formed at Prague a trading company for the sale of stock, and this company, known as "Zemka" occupies already a very important position in the supply of pig products to the city of Prague. The great importance of animal production for

agriculture under present conditions has resulted recently in the systematic organisation of the co-operative sale of live stock. The foundation of a Company for the sale of Livestock (*Zemědělský svaz pro zpeněžování dobytka*) in 1930 at Prague is only the first milestone of the road to be followed. The question is now one of applying co-operative methods to all the livestock markets of the Republic.

There are in Czechoslovakia 213 co-operative societies for the improvement and sale of stock, including 26 Czech and 44 German societies in Bohemia, 99 Czech, 31 German and 2 Polish in Moravia and Silesia, 11 in Slovakia and in Ruthenia.

H. — CO-OPERATIVE SOCIETIES FOR PRODUCTION.

The co-operative idea is also applied in Czechoslovakia in the transformation of agricultural products, in particular products of the milling and bakery societies already mentioned and of dairies, distilleries, starch factories and chicory drying societies.

(a) *Co-operative Dairies.*

The first attempts at organisation of the joint sale of dairy products date from the year 1880; no schemes were however carried through before 1890 the date of the formation of the first co-operative dairies. Their development in the different regions depended on the possibility of placing the products on the markets of the large centres. These conditions were especially favourable in Moravia from the proximity of the important market of Vienna. In Bohemia and in the industrial districts of the West the co-operative dairies were about equally numerous. During the war, the milk supply became so inadequate that the dairy societies were obliged to cease working almost entirely. They recovered only slowly from the disastrous effects of the war, and it was only in the course of the last few years that they regained their former output capacity and adapted themselves to new conditions. Since then decided progress has been made, the number and output of the societies have considerably increased, the organisation of the sale of products has been improved, buildings have been reconstructed or modern technical methods have been introduced. Moravia is always at the head of the organisation of co-operative dairies, a fact partly due to the existence in Moravia of the Kroměříž Higher School of Dairying which is celebrated.

With a view to ensuring a milk supply to the population of the large towns in Czechoslovakia, the so-called consumers' dairies have been founded. The idea is by applying co-operative methods to bring into harmony the interests of consumers and peasants. Since the carrying out of the agrarian reform it is the peasants rather than the large landowners who are the milk suppliers, and they are in a position to meet the whole of the demand, so that Czechoslovakia is self-sufficing in regard to milk supply. The co-operative dairies regularly send their butter and cheese for grading so that regular control is established. Standardisation of butter and cheese, the organisation of a market information service, centralisation of the trade in dairy products and the adaptation of the existing legal measures to modern requirements, are part of the general programme. A number of courses of instruction are organised for housewives, and propaganda of an active kind is carried on among the farmers whose collaboration is sought for. The total number of co-operative dairies in Czechoslovakia is at present 398, including 77 Czech and 31 German in Bohemia, 129 Czech and 125 German in Moravia and Silesia, and 36

in Slovakia and Ruthenia. The average production capacity of a co-operative dairy was, in 1926, as follows :

	In Bohemia	In Moravia
Quantity of milk supplied in litres	767,898	636,225
Quantity of milk and cream for direct consumption in litres	399,459	88,227
Quantity manufactured into butter kg.	13,486	22,560
Quantity manufactured into cheese kg.	14,289	36,949
Quantity manufactured into white cheese kg.	8,152	2,211
Quantity manufactured into small cheeses (in sixties)	—	616

It appears from this statement that in Moravia more attention is given to the manufacture of dairy products, while in Bohemia half the milk is supplied direct to consumers. In 1929, the producers supplied to all the co-operative dairies of Czechoslovakia 300 million litres of milk approximately, an average of 754,000 litres per society. The co-operative dairies are grouped under organising centres, or unions of dairies associated with the Co-operative Federations. There are two trading societies, founded in 1924 at Prague and at Brno engaged in the marketing of dairy products and eggs. These two societies are on the point of amalgamation.

(b) *Co-operative Distilleries and Starch Factories.*

These organisations are found more especially in the mountain regions, and in particular on the tableland situated on the frontier of Bohemia and Moravia, where the cultivation of potatoes is of special importance. The value of the distilleries to the cultivator lies not merely in the opportunity given for utilisation of the surplus crop of potatoes, but also in the fact that the refuse from the distilleries is of high value as stock feed. Although before the war there were in existence on the territory of Czechoslovakia 92 agricultural distilleries, the first of which were founded about 1900, at that time the great majority of the distilleries belonged either to the large estates or to manufacturers. The farmers were thus merely the suppliers of potatoes, and they were at the mercy of the distilleries attached to the estates. The agrarian reform, under which the estates were abolished and the lands given to peasant farmers, was naturally accompanied by far-reaching changes in these conditions, changes that are reflected very clearly in the following data.

Season	Agricultural distilleries in Czechoslovakia		Number of members	Production of alcohol in hectolitres	
	Total number	Co-operative distilleries		of all distilleries	of the co-operative distilleries
1922-23 . . .	926	112	5,720	310,009	47,447
1924-25 . . .	911	150	7,653	355,264	100,034
1926-27 . . .	908	235	11,998	360,974	157,135

The figures for the non-co-operative distilleries refer especially to Slovakia and Ruthenia. There is constant pressure being exerted to secure transformation of these into co-operative societies.

Government decrees limit each year the total quantity of fuel alcohol which may be manufactured in Czechoslovakia. Each distillery must obtain a special permit, and the quantity of alcohol for the co-operative distilleries is fixed in relation to the area farmed, the number of members of the co-operative society, and even to the kind of raw material used for the manufacture. Distilleries utilising potatoes only are authorised to distil a quantity of alcohol 25 per cent. higher. In 1929 the total quantity of alcohol was limited to 640,000 hl. of which 467,000 hl. was obtained from agricultural distilleries. The share of the 294 co-operative distilleries in this total was 233,600 hl. or 36.5 per cent. of the total quantity allowed for Czechoslovakia. The agricultural area, which serves as a basis for the fixing of the quantity, amounted in that year to 248,075 hectares, or on an average 843 ha. per society. The average membership of a distillery was 55 members.

The co-operative distilleries also have their central trading organisation and in addition a central organisation devoting attention to questions of management and technique.

There are still in existence, in Czechoslovakia, a certain number of co-operative starch factories working however under unfavourable conditions on account of the absence of markets and the competition of maize starch imported from abroad. At the present time there are in Czechoslovakia 306 co-operative distilleries and starch factories, viz., 244 Czech, 29 German and 33 in Slovakia.

(c) *Co-operative Societies for Drying of Chicory.*

A very remarkable piece of work has been done by agricultural co-operation in Czechoslovakia in the sphere of chicory production and in the preparation and trade in the derived products. The first chicory drying societies date from 1900; the introduction in 1906 of customs duties on dried chicory roots so far encouraged the movement that the organisation of these societies was even before the war very well developed. The requirements in dried chicory of the whole of ancient Austria were covered by the production of the historic countries. At the present time, the whole of the surplus quantities of chicory exported to other countries from Czechoslovakia amounting to from 50,000 to 70,000 quintals is supplied by the co-operative societies. The share of these societies in the total production of chicory in Czechoslovakia amounts to about 60 per cent. The quality of Czechoslovakian chicory is celebrated, and the products of the chicory roasting factory established by the societies at Hrades Králove under the title of "Kávo-průmysl" (Coffee industry) are highly esteemed. The 33 chicory co-operative societies are confined to Bohemia, and are affiliated to the Prague Central Union of agricultural co-operative societies, and also to a vocational organisation, known as the "Confederation of driers of chicory and beetroot".

(d) *Co-operative Spinning Mills and Societies for Production of Flax and Flax Products.*

Foreign competition acts as a handicap to the activity of these societies which are intended to assist in the improvement of the difficult position of the small weavers and encourage the production of flax in the mountain regions, formerly a very flourishing branch of agriculture in the Czech countries. In spite of all the efforts that were made after the war, the situation of these societies leaves much to

be desired. It is hoped however to improve it by the introduction of methods of standardisation and centralisation of the trade in flax products. There are in all 36 of these societies, including 23 Czech, 12 German, and one in Slovakia. They are organised into co-operative Federations, and belong to a Central Union.

(e) *Other Co-operative Societies for Production.*

There are still a certain number of other co-operative societies for production, among which the most numerous and best developed are the societies for growing and marketing of fruit and vegetables; after these the co-operative grazing societies. Some societies for joint farming, the outcome of the agrarian reform, have not yet shown proof of their value. The Czechoslovakian peasant is not an upholder of this type of farming, and in consequence these societies are mainly recruited from among the farm workers of the former estates.

I. — FARM MACHINE AND ELECTRIC SUPPLY SOCIETIES.

From 1904 onwards there had been a movement for supplying electric power at low rates to farmers and for bringing about systematic electrification of the country side by means of co-operative organisation. After the war the idea received a powerful stimulus in the law of 22 July 1919 relating to electrification. This law contained a provision in virtue of which 75 million crowns were devoted to the encouragement of the formation of co-operative electric supply societies. The last ten years have seen immense progress in the electrification of the country, particularly in Bohemia, progress which is due to a well established programme of work and to the close collaboration of the State, of the self-governing administrations, and generally of town and rural circles. Under these favourable conditions a whole system of agricultural co-operative electric supply societies has grown up. Apart from the small co-operative societies of limited capacity, formerly more numerous, but now disappearing, two types of societies of this kind are distinguished: 1. two large electric power stations serving very large areas in Bohemia and Moravia, 2. consumers' co-operative societies associated with Federations of electricity which have headquarters in large centres, and distribute current to their members, obtained from the town or private power stations.

Co-operative societies for the joint utilisation of farm machines were formed more especially between 1904 and 1911. After this latter year their development ceased and at the present time there are not more than about 200. It cannot however be concluded that farmers are not interested in the joint utilisation of machinery; the fact that these societies do not show an increase is largely due to the circumstance that the co-operative electric supply societies themselves undertake the functions of co-operative farm machine societies. The total number of Czechoslovakian co-operative farm machine and electric supply societies in 1930 was 1935, including 1496 Czech societies (1372 in Bohemia), 432 German and 7 in Slovakia.

For installation of the transmission systems, as well as for supply of necessary material the co-operative societies make use of a wholesale company trading in electric articles, founded under the title of "Ves" in 1923 by the Prague Central Union of Agricultural Co-operative Societies.

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[Basing his conclusions on a wealth of statistics, presented both in the form of tables and of diagrams, the author of this study endeavours to trace the influence of the various factors affecting the prices of cattle and beef, of sheep, mutton and lamb, and of pigs and pig products in Great Britain. He shows the variations, whether they take the form of long-time trends or of cyclical fluctuations, in home supplies, in imported supplies, and in demand, and the relations of these variations to the fluctuations in prices, or rather "purchasing power", that is, prices adjusted in accordance with the general price-level.

Contrary to what has often been assumed, the author found that there was very little relation between the supply and "purchasing power" of beef. The demand, as represented by the "purchasing power" of wages, was about five times more important in the determination of the "purchasing power" of fat cattle than the supply. The hopes of higher prices for cattle, based on an alleged shortage of the world-supply, would seem to be illusory.

There is a fairly close relationship between the number of sheep in Great Britain at any time and the "purchasing power" of prime mutton, but the demand is of greater importance than the supply in determining the "purchasing power" of the inferior qualities.

Imports of pork being small, the number of pigs in Great Britain is the most important factor in determining the "purchasing power" of pork, and even in determining that of bacon, imports of which are large, the home-produced supply is more effective than the quantities imported.

There is no evidence of cyclical fluctuations in the production of cattle in Great Britain, but there are definite cyclical fluctuations in the numbers of sheep and of pigs. The cycle of sheep production varies from 6 to 9 years, the more recent cycles lasting about 9 years. Before 1904 the cycle of pig production was from five to six years, but since that date it has tended to become shorter, and now varies between three and four years].

AGRICULTURAL LEGISLATION

Summary of Laws and Regulations.

FRANCE. — Loi des finances du 31 mars 1931 en matière agricole. — *Journal Officiel*, No. 77, (1^{er} avril 1931).

The financial law of March 31st 1931 contains measures which affect seven different aspects of agriculture namely :—

1. Measures affecting rural property.
2. Taxes and supertaxes.
3. Natural calamities.
4. Improvement of livestock and fishery.
5. Agricultural credit.
6. Land improvements (hydraulic and electric works).
7. Establishment of offices of enquiry.

It is now proposed to examine in turn these seven headings.

1. Articles 4 and 5 of the law modify the composition of the Central and Departmental Commission for Land Valuation. In certain cases exemptions are granted from death duties in the case of rural property passing in direct succession (art. 18).

2. These measures affect tea, wheat, alcohol and sugar. In virtue of article 19 the super-duty on tea is raised from 60 to 300 francs. Article 23 lowers the import duty on Algerian hard wheat. In the matter of alcohol the supertax of 250 francs is extended to Corsica which shall receive the same share of the common fund and on the same conditions as other departments (art. 25). Article 31 gives exemption from certain duties in the case of sugar and glucose employed, under conditions laid down by the administration, in the preparation of vermouths and wine *apéritifs* intended for exportation.

3. The law further deals with the measures for repairing damage caused by storms and floods. Article 81 fixes at 1.5 the rate of interest on loans granted to departments, communes and public establishments irrespective of the amount of the loan.

4. The number of donkey stallions in the national studs is increased (art. 98). Article 107 on the other hand makes provisions for the constitution of syndical associations for the stocking with fish of watercourses unsuitable for navigation or floating.

5. The law considers agricultural credit under three aspects :—

- (a) medium term credits ;
- (b) long term credits ;
- (c) investment of the surplus funds of agricultural chambers.

(a) Article 155 fixes at 280 million francs for the financial year 1931-32 the maximum sum which the Minister of Finance is authorized to take from the Deposit Bank in order to facilitate by means of fresh State advances the granting of medium term loans with the object of intensifying agricultural production.

(b) Article 160 fixes the sum available for long term loans at 77 million francs for the financial year 1931-32.

(c) Article 161 lays down that the undisposed capital of Departmental and Regional Chambers of Agriculture may be deposited on the same terms as those granted to other customers in agricultural co-operative credit banks constituted in accordance with the law of 5 August 1930 ; Chambers of Agriculture are with this object allowed to become members of the agricultural credit banks ; their liability will however be allowed in no case to exceed the amount of their shares.

6. Article 198 grants subsidies for hydraulic and rural engineering works up to a total of 300 million francs. The amount of the loans intended to facilitate the distribution of electrical power in the countryside is fixed at 150 million francs for the financial year 1931-32.

7. Article 103 establishes an economic service in the central administration of the Ministry of Agriculture.

GREAT BRITAIN. — The Agricultural Marketing Bill, No. 257, 1930.

[The main purpose of this bill is to enable schemes to be made for regulating the marketing of certain agricultural products by producers. These schemes are regional in character and must be submitted by persons "who satisfy the Minister that they are substantially representative of the persons who produce that product in the area to

which the scheme is applicable" (First Schedule of the Bill). The scheme may be approved by the Minister with or without modifications if he is satisfied that the scheme will "conduce to the more efficient production and marketing of the regulated product and to the stabilisation of the price" of that product. Any modifications proposed by the Minister shall be notified to the producers who may, if they so desire, withdraw the scheme. If the scheme has been approved the Minister shall issue an order to that effect. This order shall have the force of an act of Parliament.

Coming to the schemes themselves we find that they provide for the voluntary registration of producers and the election of boards of representatives. These Boards have wide powers described in clauses 3, 4 and 5 of the Bill, conferred upon them by the relative scheme. The scheme (clause 4) must lay down that "no sale of the regulated product shall be made by any producer who is not either a registered producer or a person exempted from registration" on grounds specified in the scheme. Secondly provision must be made for the imposition of fines on persons contravening the scheme and for arbitration. Clause 3 on the other hand details a wide range of matters for which the scheme may provide. Thus the Board may be empowered to "buy, sell, grade, pack, store, adapt for sale, insure, advertise or transport the regulated produce" or prepare and sell articles manufactured from that produce. Again the scheme may require registered producers to "sell the regulated product or any kind, variety or grade thereof only to, or through the agency of, the board". Thirdly the scheme may empower the Board to determine the kind, variety, grade or quantity of products to be sold, the sale price, the persons to whom or through whose agency the products may be sold as well as the grading, packing, storing, advertising and transporting of the product. Every Board is to possess a fund. Levies may be made on producers for the operation of the scheme, and loans may also be made to producers.

The interest of the general public is protected by the establishment (clause 7) of "Consumers' Committees". These are to be composed of a chairman and not less than six other members to be appointed by the Minister. The committees are required to consider the effect of the scheme on consumers, as well as any complaints made by them. Likewise the Minister shall appoint a special "Committee of Investigation" to consider and report on reports made by consumers' committees. (On the result of these investigations the Minister may order the amendment or revocation of the scheme or require the Board administering the particular scheme to *rectify the matter*. The Bill (clause 8) also provides for annual reports to be laid by the Minister before Parliament and also (clause 9) for the creation of "agricultural marketing funds" to provide loans to boards administering marketing schemes. The amounts and other conditions of granting of these loans are to be determined by special "Agricultural marketing facilities committees".

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(1) Previous list January 1930. The list will continue in subsequent numbers.

(2) List of abbreviations: bihebd. (twice weekly), binens. (twice monthly), bimestr. (two monthly), hebdom. (weekly), int. (price for the interior), étr. (foreign countries), irr. (irregular), mens. (monthly), N. S. (new series) sem. (half yearly), s. (series), q. (daily), trim. (quarterly), v. (volume).

MONTHLY CROP REPORT

AND AGRICULTURAL STATISTICS

The following notes refer to crop conditions quoted in the crop reports and in the tables. — Crop condition according to the system of the country: Germany, Austria, Hungary, Luxemburg and Czechoslovakia: 1 = excellent, 2 = good, 3 = average, 4 = bad, 5 = very bad; France: 100 = excellent, 70 = good, 60 = fairly good, 50 = average, 30 = bad; Lithuania, Poland, Sweden and Switzerland: 5 = excellent, 4 = good, 3 = average, 2 = bad, 1 = very bad; Netherlands: 90 = excellent, 70 = good, 60 = fairly good, 50 = below average; U. S. S. R.: 5 = good, 4 = above the average, 3 = average, 2 = below average, 1 = bad; United States: 100 = crop condition which promises a normal yield. — For other countries the system of the Institute is employed: 100 = crop condition which promises a yield equal to the average of the last ten years.

CEREALS

The data on cereal crops are now almost complete, the first estimates for Argentina having lately arrived. In the following table, accordingly, will be found the data for almost all the producing countries of the world (excepting the U. S. S. R. and China, for which complete and detailed estimates are lacking).

For wheat the production of 1930 appears to be one of the highest ever obtained, being inferior only to the exceptional crop of 1928. This result is due to the occurrence of abundant harvests both in the northern and the southern hemisphere, whereas generally a certain alternation is to be observed between the movement of the totals in the two hemispheres. Another distinctive feature of the wheat crop of 1930 is the general abundance of the crop in the countries that are predominantly exporters, in contrast to the poorness of the crop in the greater part of the importing countries; this situation is quite the reverse of that in 1929.

The crop appears to be especially large in the two great exporting countries of the southern hemisphere, where the area sown to wheat had been so greatly extended as to be the largest ever devoted to the crop. In Argentina and Australia about 38 million acres have been sown to wheat in 1930, an increase of 4 million as compared with 1929 and of about 8 million as compared with the average of the preceding quinquennium.

The Argentine crop has suffered from rust, which has somewhat reduced the unit yield, but the total crop is estimated at 163 million centals (271 million bushels) notwithstanding, one of the largest of recent years; that of Australia, which has suffered from the exceptionally rainy weather experienced at the time of ripening and harvesting is also by far the largest ever attained in the Commonwealth. The total production of the two countries, which attains 286 million centals (476 million bushels) a figure exceeded only in 1928, places about 200 million centals (330 million bushels) of exportable new crop at the disposal of importing countries.

As for world production of other cereals (excluding the U. S. S. R.), that of rye appears to be excellent, exceeded only by the record productions of last year and 1925, that of barley, though not yet completely known, through the absence of the estimate for India, appears to be much above the average and that of oats, which may be taken as complete, represents an average, since the poorness of the crop in Europe has been compensated

Production of cereals.

COUNTRIES	1930	1929	1928	1927	1926	1925	1924
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(Million centals).

Wheat.

Europe (27 countries)	818	858	845	765	730	842	638
North America (3 countries)	755	675	896	822	749	640	682
Asia (5 countries)	208	227	203	235	229	231	247
Africa (6 countries)	67	80	69	69	64	71	69
Argentina	163	98	209	160	138	115	115
Australia	123	76	96	71	96	69	99
General Totals (43 countries)	2,194	2,014	2,318	2,131	2,006	1,978	1,810

Rye.

Europe (24 countries)	515	529	505	455	426	536	371
North America (2 countries)	39	30	32	41	30	31	44
Argentina	4	2	5	4	3	3	1
General Totals (27 countries)	558	561	542	500	459	570	416

Barley.

Europe (27 countries)	359	394	354	313	320	319	269
North America (2 countries)	223	195	237	174	137	144	130
Asia (4 countries)	65	69	63	65	66	67	57
Africa (6 countries)	40	55	57	44	39	55	46
Argentina	10	8	8	7	9	8	3
General Totals (40 countries)	697	721	719	693	571	593	505

Oats.

Europe (26 countries)	527	645	582	539	596	527	483
North America (2 countries)	595	489	614	528	520	613	619
Africa (4 countries)	9	10	9	6	6	8	6
Argentina	23	22	21	17	21	26	17
General Totals (33 countries)	1,153	1,166	1,226	1,090	1,122	1,174	1,125

(Million bushels).

Wheat.

Europe (27 countries)	1,363	1,430	1,408	1,275	1,216	1,405	1,063
North America (3 countries)	1,258	1,125	1,493	1,370	1,249	1,081	1,137
Asia (5 countries)	446	379	330	391	381	385	412
Africa (6 countries)	111	134	115	115	107	119	98
Argentina	271	163	349	282	230	191	191
Australia	205	126	160	118	161	115	165
General Totals (43 countries)	3,654	3,357	3,864	3,551	3,344	3,296	3,096

Rye.

Europe (24 countries)	919	945	902	812	761	958	663
North America (2 countries)	70	54	58	74	53	56	79
Argentina	7	4	9	7	5	5	1
General Totals (27 countries)	996	1,003	969	893	819	1,019	743

Barley.

Europe (27 countries)	748	821	738	653	697	665	560
North America (2 countries)	466	406	494	363	285	301	270
Asia (4 countries)	135	144	131	135	138	140	119
Africa (6 countries)	83	116	119	92	81	115	96
Argentina	20	16	17	15	18	17	7
General Totals (40 countries)	1,452	1,503	1,490	1,258	1,189	1,238	1,052

Oats.

Europe (26 countries)	1,646	2,015	1,819	1,684	1,770	1,646	1,513
North America (2 countries)	1,858	1,529	1,920	1,650	1,654	1,915	1,834
Africa (4 countries)	26	32	27	20	18	25	19
Argentina	73	68	65	52	66	80	53
General Totals (33 countries)	3,603	3,644	3,831	3,406	3,508	3,666	3,510

Area sown with Winter Cereals.

COUNTRIES	WHEAT			RYE			BARLEY			OATS		
	1930/31	% 1930/31		1930/31	% 1930/31		1930/31	% 1930/31		1930/31	% 1930/31	
		1929-1930	1924-1925 to 1928-1929		1929-1930	1924-1925 to 1928-1929		1929-1930	1924-1925 to 1928-1929		1929-1930	1924-1925 to 1928-1929
		= 100	= 100		= 100	= 100		= 100	= 100		= 100	= 100

(thousand acres)

Germany . . .	4,324	106.9	—	10,379	90.4	—	494	101.0	—	—	—	—
Bulgaria . . .	2,908	100.0	110.8	583	85.0	130.9	514	100.0	117.3	—	—	—
Finland . . .	32	108.0	182.0	556	100.0	98.5	—	—	—	—	—	—
Lithuania . . .	410	113.3	182.5	1,136	116.6	—	—	—	—	—	—	—
Roumania . . .	5,508	92.5 (1)	77.5	605	92.4 (1)	108.0	239	83.5 (2)	80.7	—	—	—
Ukraine . . .	13,002	142.0 (3)	191.4	12,867	93.6 (3)	101.1	—	—	—	—	—	—
Canada . . .	804	85.8	94.4	944	81.0	147.8	—	—	—	—	—	—
United States (4) . . .	42,042	98.0	98.0	1,683	104.1	100.2	—	—	—	—	—	—
British India ; Punjab . . .	10,709	99.3	101.4	—	—	—	—	—	—	—	—	—
Algeria . . .	2,476	76.5	86.3	5	142.4	144.1	2,555	77.7	84.6	464	78.2	93.7
Tunis . . .	1,730	100.0	100.6	—	—	—	988	100.0	79.5	90	100.0	94.7

(1) Percentage of the mean for 1923/24 to 1928/29. — (2) Percentage of 1928/29. — (3) Percentage of the mean for 1924/25 to 1927/28. — (4) Acreage sown for grain allowance being made for average diversion to other uses.

for by its abundance in North America. In all, the production of the four cereals in 1930 is seen to be one of the highest so far recorded ; it would appear still greater if account were taken of the crops in the U. S. S. R., for which sufficiently detailed information is not yet available but of which the results are estimated at 20 % above those of 1929 for all the cereals and seed legumes, so that a notable revival of cereal exports has been possible. It is, in fact, calculated that from 1 August to 10 January there were shipped from Black Sea ports almost 44 million centals (73 million bushels) of wheat, 16 million centals (35 million bushels) of barley and 5 million centals (8 million bushels) of rye.

As regards cereal crops of the 1930-31 season it is not yet possible to form an exact idea of the possible extension of winter sowings, as the estimates so far communicated to the Institute are insufficient in number and completeness. In Europe it may be taken as probable that there will be a slight contraction in the area sown to wheat, owing to the bad weather that prevailed in autumn in certain regions of the west and centre, interrupting sowing and in some cases hindering growth. In the United States the winter wheat area has experienced a slight contraction (1.1 %) as compared with last year while that under rye has increased. There appear to be considerable reductions in northwest Africa consequent on the adverse weather of the winter season. In the U. S. S. R., according to the most recent information, there has been a marked increase (of 19 %) in wheat area with respect to last year and a moderate contraction in that of rye. In the Punjab, the principal zone of wheat production in India, the wheat area is almost the same as that of last year.

On the whole, it does not seem that the heavy fall in prices of wheat and rye has had any considerable effect in reducing the area under these two crops.

The progress of cultivation in Europe has been in general fairly satisfactory owing to the mild weather, losses having been caused only in certain regions in the west (France, Great Britain, Belgium) through excessive rain.

In the U. S. S. R. snow was rather scanty up to the middle of December, but there was then an abrupt fall in temperature accompanied by snowstorms which may have created unfavourable conditions for cereals in the regions not till then provided with a snow covering.

In the United States the development of winter crops has been in general satisfactory; in some regions, however, more precipitation is desired.

In North Africa the western sections had good rains only in the middle of December and the crop situation, which was seriously menaced by drought, was then ameliorated.

Wheat prices on the principal export markets, after a further weakening during the second half of December, showed greater resistance during the first half of January on the low levels attained.

Prices of Cereals.

Date	Wheat			Rye		Barley		Oats
	Winnipeg N° 1 Manitoba	Chicago N° 2 Hard- winter	Buenos Aires Barletta	Minnea- polis N° 2	Chicago Feeding	California malting	London and Liverpool Daubian	Buenos Aires Current quality
	cents per bushel	cents per bushel	pesos p. per quintal	cents per bushel	cents per bushel	shillings p. 448 lbs.	shillings p. 400 lbs.	pesos p. per quint.
October, 3	78	81	8.40	52 1/2	50	26/6	14/-	3.75
" 10	72 1/2	79 1/2	8.25	50	50	26/6	13/9	3.80
" 17	71 1/2	77	8.20	48	47	26/6	13/1 1/2	3.75
" 24	72 1/2	80 1/2	8.00	40	46	26/6	13/-	3.60
" 31	71 1/2	n. 77 1/2	8.15	47	48	26/6	12/1 1/2	3.40
November, 7	68 1/2	75	7.60	43	43	26/6	12/0	3.20
" 14	64	73 1/2	7.35	42	46	26/3	13/1 1/2	3.30
" 21	63	n. 75 1/2	6.50	42	45	25/9	13/6	3.15
" 28	61 1/2	n. 75 1/2	6.65	44	47	25/9	14/0	3.25
December, 5	59 1/2	79 1/2	6.75	50	48	25/6	15/3	3.35
" 12	56 1/2	78 1/2	6.60	46	52	25/6	14/6	3.30
" 19	53 1/2	78 1/2	6.40	43 1/2	45	25/6	14/4 1/2	3.05
" 26	50 1/2	78 1/2	6.20	38	41	(1) 25/6	(1) 13/-	3.00
January, 2, 1931	53 1/2	78 1/2	(2) 6.15	39	32	25/6	14/4 1/2	3.00
" 9, "	53 1/2	80	6.35	38 1/2	41	26/-	n. q.	3.10
" 16, "	53 1/2	80 1/2	6.25	39 1/2	41	26/6	n. q.	3.15

(1) Price of December 24. — (2) Price of December 31.

Germany: The Central Office of Statistics of Germany has published estimates of the variations in areas under winter cereals compared with last year. The data are given in the table. Here may be mentioned the tendency to change in crop production as a result of the agricultural crisis and measures taken by the Government for the reduction of the rye area. The area under winter rye, in fact, is found to be reduced by 9.6 % compared with last year while the wheat and barley areas have increased by 6.9 % and 1.6 % respectively. Not until the spring estimates are made, however, will an indication be had of the extent to which the reduction in the winter rye area has favoured the increase of other crops.

The definitive data for area and production of winter spelt and cereal mixtures are as follows:

	1930	1929	1924-28	% 1930 1929 = 100 1924-28 = 100	
			Area.		
Winter spelt (1000 acres)	293	301	308	97.3	95.3
Cereal mixtures "	886	908	(1) 888	97.6	(1) 99.8
			Production.		
Winter spelt (1000 centals)	3,048	3,321	3,112	91.8	98.0
Cereal mixtures (1000 bushels)	21,486	25,659	(1) 23,009	83.7	(1) 93.4
(1000 centals).	12,461	14,882	(1) 13,345		

Austria : After some rather warm days at the beginning of December there was a fall in temperature accompanied by mists. On about the 10th of the month there was heavy precipitation, chiefly in the form of snow. The sky then cleared and severe night frosts occurred. The rise in temperature before Christmas caused considerable melting of snow.

In the period of most severe frost the winter sowings were protected by a snow cover. The alternation of frost and thaw caused some damage to winter barley.

Crop condition of winter cereals on January was as follows : wheat : 2.4 (against 2.3 on December 1 and 2.4 on January 1, 1930) ; rye : 2.2 (2.2, 2.3) ; barley : 2.4 (2.3, 2.3).

Belgium : There were a few days of rain and slight frost during December. Weather, on the whole, was mild.

The first sowings of winter cereals are in very good condition. Wheat sown a short time before the heavy rains is sprouting irregularly and will probably need partial re-sowing.

Bulgaria : The winter has been delayed and only in the second half of December was there snow over all the country except the Black Sea districts. Sowings have sprouted in good condition and frost damage has not been reported.

Irish Free State : The unsettled weather of December following on the almost continuous rains of the preceding months, left the soil unsuitable for seeding and the area under winter cereals is therefore considerably less than last year. The weather was not, however, as harsh as during the preceding months and such early sowings as had been made suffered no injury, germinating uniformly and sprouting evenly and looking vigorous and healthy at the end of the month.

Finland : Winter sowings were made under good conditions and germination has been regular.

France : Since last month the situation has become still worse. Apart from a very short period of dry cold, which brought forward the later sowings, the weather was continuously mild and rainy and in the earlier part of January further flooding was experienced in the Paris basin.

Under these circumstances it was impossible to sow all the fields intended for winter cereals, while some had to be resown, the corn not having sprouted. It may, therefore, be affirmed that the estimate of 1 January 1931 for area sown to winter cereals will be below that of last year and quite certainly below all those of the same date since

Cereals.

COUNTRIES	(t) AREA					(t) PRODUCTION									
	1930	1929	Average	%	1930	1930	1929	Average	1930	1929	Average	%	1930		
	—	—	1924	1929	1930/31	—	—	1924	—	—	1924	1929	1930/31		
	1930/31	1929/30	1924/25 to 1928/29	1929/ 1930 = 100	Aver.	1930/31	1929/30	1924/25 to 1928/29	1930/31	1929/30	1924/25 to 1928/29	1929 1930 = 100	Aver.		
	1,000 acres					1,000 centals					1,000 bushels				
WHEAT															
Germany	4,402	3,955	4,001	111.3	110.0	83,531	73,838	67,796	139,216	123,062	112,991	113.1	123.2		
Austria	501	515	497	97.3	100.8	6,830	6,936	6,417	11,383	11,559	10,695	98.5	106.4		
Belgium	414	356	372	116.2	111.5	8,128	7,935	8,853	13,547	13,225	14,755	102.4	91.8		
Bulgaria	2,958	2,661	2,628	111.1	112.5	34,964	19,915	23,265	58,272	33,191	36,776	175.6	150.8		
Denmark	252	257	225	97.8	111.9	6,283	7,093	5,520	10,472	11,772	9,900	80.0	113.8		
Spain	10,531	10,622	10,637	99.1	99.0	87,596	92,548	83,483	145,991	154,244	139,185	94.6	104.9		
Estonia	90	82	58	109.8	155.4	758	756	518	1,293	1,260	863	100.2	146.3		
Irish Free State	27	29	30	93.6	89.1	...	710	666	...	1,184	1,100	...	...
Finland	51	47	41	108.5	124.3	713	657	565	1,189	1,095	941	180.0	125.3		
France	13,202	12,750	13,297	103.5	99.3	138,673	191,920	168,086	231,118	319,861	280,138	72.3	82.5		
Engl. and Wales	1,346	1,390	1,534	101.2	87.8	23,968	28,470	30,088	39,947	47,450	50,145	84.2	79.7		
Scotland	54	51	55	106.3	97.5	1,277	1,281	1,281	2,128	2,165	2,135	96.3	99.7		
North Ireland	5	4	5	125.0	88.3	...	85	109	...	142	182	...	...
Greece	1,191	1,249	1,234	95.4	96.5	6,346	5,101	6,899	10,577	8,501	11,481	124.4	92.1		
Hungary	4,071	3,708	3,779	109.8	107.7	44,001	44,992	44,916	73,334	74,985	74,859	97.8	98.8		
Italy	11,910	11,794	11,933	101.0	99.8	126,492	156,077	129,727	210,815	260,123	211,207	81.0	99.8		
Latvia	179	145	131	123.2	136.0	2,206	1,402	1,289	3,076	2,336	2,148	157.4	171.1		
Lithuania	526	488	296	107.7	177.7	6,362	5,598	2,926	10,903	9,329	4,677	113.7	217.4		
Luxemburg	25	21	31	124.0	83.3	273	165	348	455	275	580	165.3	78.3		
Malta	9	9	9	103.2	101.3	182	176	172	803	293	287	108.3	106.5		
Norway	30	30	24	103.2	128.7	466	450	357	776	750	595	103.4	150.3		
Netherlands	144	112	137	128.3	105.4	2,983	3,280	3,522	4,971	5,467	5,870	90.0	84.7		
Poland	3,080	3,526	3,230	112.9	123.2	47,840	39,917	32,896	70,733	65,861	54,825	121.1	145.4		
Portugal	(1) 1,091	1,091	1,067	...	...	7,886	6,489	6,073	13,143	10,814	10,121	121.5	129.9
Rumania	7,551	6,764	7,961	111.6	94.9	78,463	59,582	59,800	130,769	99,752	99,664	131.1	137.2		
Sweden	646	574	438	112.6	147.8	13,278	11,419	8,076	22,180	19,032	13,401	116.3	164.4		
Switzerland (2)	182	174	108	104.5	108.1	3,202	3,472	3,229	5,387	5,787	5,381	92.2	90.2		
Czechoslovakia (3)	2,112	2,023	1,812	104.4	...	31,847	31,742	26,822	53,077	52,902	44,703	100.3	...		
Yugoslavia	5,857	5,810	4,530	100.9	118.3	53,404	57,000	44,125	89,004	94,998	78,541	93.7	121.0		
U. S. S. R. (4)	58,891	58,510	(5) 40,994	100.7	117.8	...	...	...	...	...	...	...	...
Canada	24,897	25,255	22,464	98.6	110.8	237,512	182,712	253,337	395,854	304,530	422,220	130.0	93.8		
United States (5)	38,908	40,050	35,586	96.4	108.5	302,002	345,728	330,348	601,337	576,213	550,569	104.9	109.8		
	20,545	21,405	20,079	96.0	102.3	147,977	139,778	169,520	246,628	232,963	282,528	105.9	87.3		
Guatemala	13	18	25	71.4	51.3	...	91	121	...	152	201	...	...
Mexico	1,207	1,293	1,283	93.3	94.1	6,765	6,800	6,339	11,274	11,333	10,565	99.5	106.7		
China: Manchuria	3,393	3,775	3,254	106.8	104.3	29,909	28,696	(7) 35,408	49,488	47,881	(7) 50,012	104.2	84.5		
Korea	848	874	892	97.0	95.1	5,391	4,992	5,841	8,994	8,320	9,736	100.0	92.3		
India	31,347	31,973	31,318	98.0	100.1	231,097	192,438	195,465	386,612	320,731	325,908	120.5	118.6		
Japan	1,198	1,214	1,161	98.7	103.2	17,723	18,298	17,207	29,538	30,496	28,677	96.9	103.0		
Pakistan	...	...	...	...	...	1,960	1,875	2,015	3,282	3,126	3,858	106.0	97.7
Syria and Lebanon	1,175	899	1,260	130.7	93.3	10,735	9,773	9,691	17,892	16,288	11,602	109.8	154.2		
Algeria	3,944	3,795	3,600	103.9	109.6	18,387	19,984	15,862	30,614	33,306	26,437	88.4	111.3		
Cyrenaica	38	24	38	157.0	99.7	93	125	97	155	209	161	74.2	96.2		
Egypt	1,577	1,615	1,514	97.9	104.1	24,690	27,137	22,714	41,100	45,228	37,856	90.9	108.6		
French Morocco	2,236	3,011	2,522	74.3	88.7	11,023	19,059	17,229	18,372	31,764	27,614	57.8	64.0		
Tunis	1,050	1,730	1,612	95.7	102.7	5,798	7,386	6,019	9,693	12,309	10,031	78.5	96.3		
Argentina	19,700	15,914	19,034	123.9	103.5	162,845	97,547	149,246	271,402	162,575	248,739	106.9	109.1		
Chile	1,610	1,758	1,543	91.6	104.3	...	22,231	16,168	...	37,052	26,946	...	...
Uruguay	864	1,097	1,006	78.8	85.9	...	7,894	6,945	...	13,157	14,574	...	...
Kenya	(8) ...	(7) 8	(6) 48	...	...	...	587	286	...	978	443	...	...
Un. of South Afr.	1,137	942	841	120.7	135.2	6,164	6,694	4,332	10,273	11,140	7,220	92.2	142.8		
Australia	18,160	14,931	11,063	121.6	151.8	123,000	75,886	86,139	205,000	126,477	143,653	162.1	142.8		
New Zealand	243	236	211	103.0	115.2	...	4,344	4,367	...	7,240	7,278	...	...
Totals	244,471	237,743	238,546	102.8	107.6	2,320,443	2,041,893	2,986,123	3,706,765	3,401,792	3,476,811	108.8	106.4		

RYE

Germany	11,642	11,680	11,383	99.7	102.3	169,297	179,788	156,766	302,317	321,050	279,045	94.2	106.0
Austria	922	925	947	99.7	97.4	11,543	11,254	10,820	20,613	20,097	19,321	102.6	106.7
Belgium	564	567	567	99.4	99.4	11,064	12,411	12,059	19,757	22,162	21,498	89.1	91.9
Bulgaria	648	536	456	121.0	142.2	7,577	4,109	3,764	18,530	7,337	6,722	184.4	201.8
Denmark	372	376	466	99.0	80.1	5,622	5,830	6,851	10,039	10,411	11,841	96.4	86.5
Spain	1,446	1,519	1,747	95.2	82.8	11,580	12,944	13,507	20,679	22,935	24,119	90.2	85.7
Estonia	367	329	367	111.3	99.3	4,556	3,212	3,288	8,186	6,798	5,890	141.8	138.4
Irish Free State	4	4	7	80.8	53.3	...	71	105	...	126	187	...	...
Finland	568	563	565	101.0	100.6	7,898	7,852	6,803	14,104	13,129	12,149	107.4	116.1
France	1,878	1,936	2,025	97.0	92.8	16,393	22,082	20,398	29,255	39,488	36,408	74.2	80.4
Greece	744	172	118	88.9	127.1	886	725	819	1,681	1,296	1,468	122.1	108.1

COUNTRIES	(1) AREA					(1) PRODUCTION							
	1930	1929	Average 1924 to 1928	% 1930/31	1930	1930	1929	Average 1924 to 1928	1930	1929	Average 1924 to 1928	% 1930/31	1930
	—	—	—	—	—	—	—	—	—	—	—	—	—
	1930/31	1929/30	1924/25 to 1928/29	1929/ 1930 = 100	Aver. 1930 = 100	1930/31	1929/30	1924/25 to 1928/29	1930/31	1929/30	1924/25 to 1928/29	1929/ 1930 = 100	Aver. 1930 = 100
	1,000 acres					1,000 centals				1,000 bushels			
Hungary	1,571	1,623	1,652	96.8	95.1	14,800	17,597	15,792	26,429	31,424	28,199	84.1	93.7
Italy	301	308	307	97.9	97.9	3,428	3,809	3,560	6,121	6,909	6,357	88.6	96.3
Latvia	660	590	641	111.7	102.8	7,757	5,322	5,042	13,851	9,503	9,004	145.8	153.8
Lithuania	1,197	1,113	1,235	107.5	96.9	18,912	12,337	10,990	24,842	22,031	19,626	112.8	126.6
Luxemburg	22	18	16	120.7	132.0	232	233	103	415	416	345	99.0	120.4
Norway	19	18	22	104.3	85.1	329	301	336	587	538	600	109.1	97.8
Netherlands	494	488	480	101.3	101.1	6,986	10,248	8,559	12,385	18,300	15,284	67.7	81.0
Poland	14,509	14,328	13,719	101.3	105.8	152,580	164,539	122,034	272,430	275,064	217,919	98.7	125.0
Portugal	(1) 577	577	625	—	—	2,723	2,624	2,525	4,863	4,686	4,509	103.8	107.8
Rumania	908	773	699	125.2	138.4	10,241	7,429	5,153	18,288	13,266	9,202	137.9	198.7
Sweden	592	631	746	93.8	79.4	10,734	9,118	10,404	19,169	10,282	18,578	117.7	103.2
Switzerland	50	49	49	100.9	102.7	848	904	892	1,514	1,614	1,593	93.8	95.1
Czechoslovakia (3)	2,076	2,690	2,499	90.5	—	38,106	40,424	34,969	68,047	72,186	62,499	94.3	—
Yugoslavia	625	602	511	103.9	122.5	5,355	4,690	3,843	9,562	8,208	6,802	115.7	139.4
Canada	1,442	992	774	145.4	186.3	12,481	7,370	7,311	22,287	13,160	13,055	109.9	170.7
United States	3,722	3,331	3,766	111.7	98.8	28,131	23,470	28,478	50,284	41,911	50,851	119.9	98.8
Algeria	5	3	3	138.6	168.3	30	27	19	70	48	34	146.3	206.5
French Morocco	1	3	2	46.8	79.1	6	17	9	11	31	16	87.4	71.5
Argentina	626	543	468	115.3	133.8	3,735	2,465	3,022	6,670	4,401	5,397	151.6	123.6
*Chile	8	8	6	96.1	121.6	—	79	57	—	142	101	—	—
Totals	48,686	47,283	46,838	102.8	103.7	558,758	562,531	497,710	997,786	1,004,523	888,771	99.3	112.3

BARLEY

Germany	3,753	3,835	3,639	97.9	103.1	69,058	70,124	59,729	131,373	146,093	124,438	89.9	105.6
Austria	414	391	361	106.0	114.9	5,430	5,940	4,741	11,313	12,374	9,877	91.4	114.8
Belgium	74	63	80	117.6	92.2	1,589	1,900	1,981	3,291	2,894	4,127	116.1	79.7
Bulgaria	873	542	559	124.2	120.4	9,074	4,503	5,638	18,905	9,381	11,741	201.6	161.0
Denmark	988	909	792	103.2	118.4	23,876	24,525	18,320	49,743	51,094	38,197	97.4	130.8
Spain	4,390	4,400	4,438	97.8	98.0	45,625	46,723	43,583	101,096	97,842	90,793	103.9	111.3
Estonia	276	281	290	98.1	95.9	2,741	2,861	2,440	5,710	5,897	5,090	100.4	112.4
Irish Free State	116	116	130	98.8	83.9	—	2,987	2,982	—	5,960	6,213	—	—
Finland	272	272	271	100.0	100.3	—	2,961	3,067	6,223	6,168	8,899	109.9	97.4
France	1,799	1,853	1,740	97.1	103.4	21,792	28,332	23,256	45,338	50,025	48,451	76.8	93.8
Engl. and Wales	1,026	1,120	1,203	91.6	85.3	16,509	22,355	21,598	34,393	46,574	44,907	73.8	76.4
Scotland	107	101	131	106.0	81.2	2,128	2,262	2,558	4,433	4,713	5,320	94.1	83.2
Northern Ireland	2	2	2	114.5	107.8	—	41	—	—	85	85	—	—
Greece	490	536	463	91.5	105.7	3,714	2,267	3,205	7,737	4,724	6,678	163.8	115.9
Hungary	1,129	1,178	1,020	95.8	110.7	11,800	15,049	11,521	24,597	31,358	24,002	78.4	102.5
Italy	582	579	576	100.6	101.1	5,359	5,794	5,091	11,105	12,071	10,607	92.5	107.1
Latvia	437	451	434	96.9	100.8	3,900	4,583	3,218	8,143	9,548	6,703	85.3	121.5
Lithuania	529	529	485	99.9	108.9	4,838	5,897	4,546	10,179	12,286	9,471	82.0	106.4
Luxemburg	7	14	7	54.7	90.2	86	207	87	179	431	182	41.5	96.5
Malta (g)	7	6	6	109.1	104.3	142	137	137	295	296	285	103.0	103.5
Norway	134	132	143	101.8	93.8	2,419	2,176	2,381	5,039	4,533	4,961	111.2	101.6
Netherlands	77	78	68	99.0	113.5	1,069	2,405	1,777	3,477	5,010	3,701	99.4	93.9
Poland	3,054	3,110	2,761	98.2	110.6	32,408	36,582	27,635	67,518	76,235	57,574	88.6	117.3
Portugal	186	186	190	—	—	1,273	940	882	2,651	1,958	1,838	135.4	144.8
Rumania	4,881	5,074	4,200	90.2	114.6	52,270	60,417	27,103	108,016	125,871	56,463	86.5	102.9
Sweden	325	307	372	100.0	87.4	4,784	5,513	5,904	9,967	11,485	12,300	96.8	81.0
Switzerland	16	16	16	100.2	101.4	247	207	204	514	556	549	92.0	93.0
Czechoslovakia (3)	1,830	1,839	1,782	99.5	—	27,107	30,755	26,706	56,475	64,074	55,638	88.1	—
Yugoslavia	1,129	1,108	941	101.8	120.0	9,231	9,080	7,819	19,231	18,918	16,291	101.7	118.0
Canada	5,558	5,926	3,793	93.8	146.5	66,222	49,110	48,880	137,063	102,313	101,848	134.8	135.5
United States	12,447	13,068	8,993	95.2	138.4	166,429	145,388	115,564	325,893	302,892	240,743	107.6	135.4
Korea	2,382	2,295	2,175	103.8	109.5	19,127	18,054	16,614	39,849	37,613	36,697	105.9	108.6
Japan	2,110	2,202	2,388	95.8	88.3	34,786	38,572	40,188	72,472	80,360	89,715	90.2	86.8
Palestine	—	—	—	—	—	1,329	1,146	1,030	2,768	2,387	2,146	116.0	218.1
Syria and Lebanon	840	750	741	112.1	113.4	10,303	11,455	4,980	21,404	23,800	10,375	89.9	206.9
Algeria	3,602	3,536	3,380	101.8	106.5	18,078	19,414	14,634	37,063	40,446	30,487	93.1	123.5
Cyrenaica	127	94	160	134.8	75.0	276	756	628	574	1,575	1,300	86.5	48.9
Egypt	345	401	363	96.0	95.1	5,086	6,081	5,256	10,960	12,060	10,951	93.6	98.0
French Morocco	2,955	3,240	3,004	91.2	98.4	13,228	22,712	23,909	27,558	47,318	49,812	58.2	55.3
Tunis	988	1,238	1,143	80.0	86.5	2,649	5,512	3,358	5,512	11,483	6,995	48.0	78.3
Argentina	921	802	726	114.8	120.9	9,533	7,743	7,082	19,800	16,132	14,755	123.0	134.6
Chile	106	195	178	85.4	93.5	—	8,394	2,717	—	7,071	5,060	—	—
Uruguay	12	15	7	81.2	185.6	—	129	—	—	368	100	—	—
*Kenya (8)	8	15	3	19.0	96.4	—	84	—	—	176	29	—	—
Un. of South Afr.	70	91	78	77.4	90.2	503	1,006	518	1,048	2,097	1,078	60.0	97.1
*New Zealand	25	18	24	188.5	103.8	—	378	492	—	786	962	—	—
Totals	64,696	63,446	53,931	97.2	112.3	695,158	719,397	597,786	1,448,233	1,499,398	1,245,408	96.4	112.3

COUNTRIES	(t) AREA					(t) PRODUCTION						
	1930	1929	Average 1924 to 1928	% 1930-31	1930	1929	Average 1924 to 1928	1930	1929	Average 1924 to 1928	% 1930-31	
	1930/31	1929/30	1924/25 to 1928/29	1929/ 1930 = 100	1930/31	1929/30	1924/25 to 1928/29	1930/31	1929/30	1924/25 to 1928/29	1929/ 1930 = 100	
	1,000 acres					1,000 centals					1,000 bushels	
	OATS											
Germany	8,400	8,703	8,623	96.7	98.6	124,702	102,705	136,270	380,000	508,636	425,842	76.6
Austria	783	733	763	104.1	100.1	8,539	9,944	9,064	26,683	31,074	28,326	86.9
Belgium	676	744	660	90.9	102.5	10,863	16,476	14,852	33,047	51,488	46,413	65.9
Bulgaria	340	387	335	87.9	101.3	3,187	3,013	2,136	9,061	9,416	6,074	105.8
Denmark	907	908	1,000	99.9	91.3	22,796	22,900	20,085	71,237	71,276	64,040	90.9
Spain	1,768	1,840	1,834	96.1	96.4	16,854	11,660	11,859	52,670	45,812	37,000	115.0
Estonia	368	371	365	98.1	100.9	3,415	3,289	2,631	10,671	10,277	8,223	103.8
Irish Free State	614	606	690	96.6	97.5	22,796	15,142	13,491	...	48,257	42,158	...
Finland	1,137	1,138	1,093	99.9	104.0	13,267	12,150	12,673	41,458	37,068	39,604	100.2
France	8,583	8,065	8,382	99.1	100.0	96,880	126,613	107,575	392,740	395,755	336,168	78.5
Engl. and Wales	1,773	1,851	1,856	95.6	95.5	30,038	34,093	32,065	93,870	106,540	100,170	88.1
Scotland	802	880	919	97.0	97.7	14,401	16,912	15,440	45,280	52,850	48,874	85.7
Northern Ireland	307	314	318	97.7	96.4	6,493	6,423	6,213	...	20,072	19,415	...
Greece	322	337	263	95.6	122.8	1,657	1,010	1,498	5,179	3,251	1,680	159.3
Hungary	637	745	690	85.5	93.6	4,925	9,053	7,130	15,381	28,292	23,218	51.4
Italy	1,263	1,293	1,221	97.7	103.5	11,790	15,414	12,968	36,814	48,261	40,524	76.3
Latvia	790	717	755	105.8	104.6	7,109	7,490	5,173	23,433	23,433	16,171	100.0
Lithuania	856	805	815	98.8	101.9	8,470	9,075	6,101	26,470	30,235	19,064	87.5
Luxembourg	70	77	71	91.0	98.7	880	1,158	478	2,749	3,017	2,744	76.0
Norway	239	239	230	100.2	99.9	4,105	3,887	3,859	14,047	12,146	12,060	115.7
Netherlands	340	396	373	96.0	101.8	5,615	4,249	7,019	17,327	25,777	21,034	67.2
Poland	5,120	5,416	4,989	100.1	110.9	52,029	65,105	45,018	162,590	203,151	140,681	79.9
Portugal	519	519	539	...	...	2,471	1,783	1,796	7,723	5,571	5,552	138.6
Rumania	2,046	2,097	2,247	89.6	95.3	26,497	29,967	19,213	79,679	69,647	60,041	85.1
Sweden	1,874	1,711	1,796	107.5	104.4	23,080	28,237	25,494	72,125	88,239	70,670	81.7
Switzerland	18	51	50	95.8	96.5	810	926	915	2,532	2,891	2,860	87.5
Czechoslovakia (1) . . .	2,140	2,150	2,050	99.5	...	27,340	32,947	29,024	85,137	102,927	92,574	83.0
Yugoslavia	1,086	993	919	105.4	112.8	5,324	7,733	7,332	16,638	24,106	22,912	68.8
Canada	13,223	12,479	13,233	106.0	90.9	145,013	96,165	141,681	455,978	300,516	442,749	151.7
United States	41,708	40,913	42,968	103.9	96.8	448,648	304,078	438,974	1,402,026	1,228,369	1,371,755	114.1
Syria and Lebanon	28	28	41	101.0	68.4	176	230	264	550	718	825	76.6
Algeria	62	639	601	99.9	105.1	4,321	4,731	3,757	13,503	14,786	11,739	91.3
French Morocco	93	116	57	80.3	162.0	823	1,092	430	2,572	3,413	1,363	75.4
Tunis	90	96	101	102.0	97.9	551	1,102	653	1,722	3,445	2,030	50.0
Argentina	2,051	2,160	2,022	93.0	101.4	23,231	21,834	20,328	72,500	68,294	63,526	106.3
*Chile	193	243	160	79.2	120.5	3,329	1,925	1,425	10,401	5,702	...	...
*Uruguay	179	205	136	87.2	131.2	1,241	824	824	3,877	2,574	...	...
Union of South Afr	635	638	608	77.8	88.1	2,050	3,292	2,215	6,408	10,280	6,921	62.3
*New Zealand	322	68	106	475.5	304.6	...	1,171	1,690	...	3,059	5,200	...
Totals	102,274	101,190	103,207	101.1	99.1	1,152,559	1,166,391	1,148,058	3,601,745	3,646,829	3,567,655	98.8

(t) The two dates mentioned refer to the years in which the harvest took place in the northern and southern hemispheres respectively. —
 * Countries not included in the totals — s) Autumn crops. t) Spring crops. (1) Preceding year's figures — (2) Including spelt and meslin.
 (3) The figures for the averages are not exactly comparable with those for the years 1930 and 1929 owing to changes in the method of making estimates. (4) For 1930 area sown, for the previous years area harvested — (5) Average 1925 to 1928 (6) Year 1928. —
 (7) Average 1927 and 1928. — (8) Area sown — (9) Barley and meslin.

1923 In the absence of exceptionally favourable conditions permitting the resowing of much of the area in January and February it may be expected that the area on which winter cereals will be harvested will be very considerably below 12 million acres, especially when it is considered that in the majority of cases the areas harvested will be less than those sown as on 1 January. If conditions are favourable to spring sowings these may cover 620,000-690,000 acres; even in these circumstances it is probable that the total area sown to wheat for harvest in 1931 will be below the very small areas of 1928 (12,748,000 acres) and 1922 (12,701,000). If, on the other hand, statistics of the area

devoted to other spring cereals — oats and barley — it may be definitely stated that it has changed only within very narrow limits, the maximum deviation being 4 %, so that these crops cannot be relied on to make up for the deficit. On the whole, then, it may be estimated that the area devoted to cereals in 1931 will be under 23,105,000 acres, despite the fact that last year it was 23,574,000 acres and on the average to the preceding years was 23,559,000 ; only 1922, 1920 and 1919 have been such bad years.

It must also be noticed that much of the corn has been sown very late and has sprouted very irregularly and in general thinly though the first sowings have developed well ; it is known, too, that the yields of the late corn are rarely good. The mild, wet weather has favoured weeds, insects, slugs and rodents.

Preparations for spring sowings were carried out in December under good conditions despite the wet weather, since growers made good use of the short spell of cold, dry weather ; the very heavy rains at the beginning of January stopped work. Carting of manure and artificial fertilisers was very difficult and often impossible. The second week of January was cold and dry bringing some slight improvement in conditions of work and in the state of the sowings.

Great Britain and Northern Ireland : Both in England and Wales and in Scotland, open and more or less wet weather, unsuitable for outdoor work, prevailed in December ; in Northern Ireland, on the other hand, fairly lengthy spells of mild, dry weather were experienced, though in the intervals there were heavy showers and about the middle and end of the month severe ground frosts.

Owing to the excessive rain in most parts of England and Wales save the northeast cultivation and sowing were hardly as forward as usual in many districts, the area sown to wheat and oats by the end of December being somewhat smaller than at the corresponding date last year, while that under barley was slightly less ; in Northern Ireland, too, though a fair amount of ploughing was done in some districts, this work was still considerably in arrear ; in Scotland, on the other hand, wheat sowing was practically completed in December under generally favourable conditions. Throughout Great Britain germination and brairding of autumn-sown corn were favoured by the mild weather.

In Northern Ireland threshing continued in December, the unit yields of wheat and oats being good, though quality has suffered through the bad weather that prevailed during harvesting ; the small lots of barley threshed gave fairly good yields of average quality.

Hungary. (Telegram of January 19) : Condition of winter crops is good thanks to mild temperatures and rainy weather.

Italy : Wheat, which in many districts in the plains received the first applications of nitrates in December, developed regularly almost everywhere.

Latvia : Weather in December was variable and moderately cold. Precipitation was generally 50 % below normal ; the fields were covered lightly with snow in the latter half of the month.

Lithuania : Winter sowings were carried out under good conditions and germination has been regular and uniform. Weather in December and the beginning of January was favourable ; the soil is frozen and covered by a thick layer of snow.

Rumania : In the two-week period from November 26 to December 10 of last year precipitation was fairly frequent. Snowfall was recorded only in some Carpathian areas.

The period December 10-31 was also characterised by much precipitation.

At the beginning of January sowings in the northern area of the country and in hill and mountain regions, were protected by a sufficiently deep snow cover.

In the Danube plains relatively little snow fell and sowings are in places uncovered. Due to the fairly advanced state of growth and temperatures not too low, however, crops in these regions also are not in danger.

Yugoslavia : In the first week of December weather was cold, with much snow, but the rise of temperature in the following two weeks caused the disappearance of the snow from the fields. In the last week of the month, however, the cold was renewed and the snow lay. These weather conditions have favoured sowings.

U. S. S. R. : The mild weather of the third decade of November was maintained in the first half of December in the greater part of the regions in the European territory of the Union ; in the middle of the month the thaw-line passed approximately through Archangel and Orenburg. In Western Siberia and the republics of Central Asia temperature was normal ; in Eastern Siberia below normal. Precipitation in the first decade of December was small in the northeast and south of the European part of the Union while in the other parts it was 10-20 mm. (0.4-0.8 in.). The southern part of the Union was almost entirely free of snow, while in other parts the maximum depth was 40 cm. (16 in.) and in Siberia 20-40 cm. (8-16 in.).

In the second decade and beginning of the third there was almost everywhere a rather sharp fall in temperature accompanied by more or less general snowfall, especially in the European part of the Union. The steep fall in temperature created conditions unfavourable to cereals in some regions (those of the Urals and some others) where the snow cover was thin.

According to the most recent official information the area sown to winter cereals (rye, wheat and barley) in autumn of the current crop year exceeds that of the preceding year at the corresponding date by about 5 million acres, the increase for wheat being 19 %.

Argentina : Generally the wheat crop has been harvested in good conditions in all the provinces with excellent results, especially in the west of Buenos Aires province. On the other hand in many districts of the southwest these are complaints of severe drought. In Santa Fé province the product is of good quality, as also in Cordoba, where the best yields were given by the varieties 38 M. A. (Ministerio Agricultura), San Martin and Barletta. On the other hand, in the east of Cordoba 70 % of the crop is of bad quality and low specific gravity, with the result that many growers have preferred to leave it in the fields. In parts of the south of the same province, too, many fields have not been harvested owing to the low yield. In Entre Rios province yield has been normal and quality is good. On the Pampa the crop has been poor in the north and bad in the south. The drought and strong winds of winter have caused damage in many districts. In San Luis the crop has been good and in Santiago del Estero, which has produced cereals for some years, it is of good quality.

Due to the low price of oats, which generally does not cover its cost of production the crop in many areas has not been harvested but grazed, especially in the provinces of Buenos Aires, Entre Rios and Cordoba and in the Pampa. For similar reasons rye crops in South Cordoba have not been harvested.

United States : The crop conditions of winter wheat and rye (for grain) on December 1, according to the system of the United States were 86.3 and 82.6 respectively compared with 86.0 and 87.2 on December, 1, 1929 and 83.2 and 87.8, the ten year averages of 1919-28.

The crop condition of winter wheat improved at the end of December according to telegraphic information from the Department of Agriculture and at the beginning of the New Year was good to excellent in all the main producing sections. Practi-

cally the only snow cover existing in this area was in the northern Ohio Valley States. The crop was not frozen down much in the south-western part of the belt and was being grazed. The snow cover varied widely in the Northwest, but wheat was apparently in satisfactory condition, although there were some reports of damage by cold winds. Most grain fields were securely covered in the central section of the Rocky Mountain region ; some retardation of growth was noted in the southwestern section. There was a considerable snow cover in the Northeast while in the Middle Atlantic States there was more or less varying protection. At the end of the first week of January, condition was good ; at this date damper weather was reported to be desirable in Illinois. At the middle of January, crop condition was satisfactory ; partial falls of snow had occurred but damper weather was again desirable in the Ohio valley.

India : Weather during December in the Punjab was predominantly dry except for light falls of rain in Ambala at the end of the month and rain is badly needed. At the middle of the month wheat was reported to have been slightly damaged by frost and white ants in Ambala and insects damaged crops in parts of Rohtak at the end of the month. The condition of irrigated crops was average to good at the beginning of January and that of unirrigated crops below the average to average.

According to a telegram dated January 17th from the Punjab Département of Agriculture, the crop condition of wheat is estimated at 91 % of the normal compared with 98 % at the corresponding period of last year.

Palestine : The rains of December improved soil condition, allowing final cereal sowings to be carried out and ensuring good germination throughout almost the entire country.

Syria and Lebanon : Preparatory work has been facilitated by the extension of motor traction ; sowings have been effected under favourable conditions. Germination has been retarded by drought in the Syrian State and the government of Latakia, but is, all the same, fairly good in the former and normal and regular in the latter ; in the Lebanese State rains have permitted regular development.

Turkey : The rains at the end of December and in the first days of January in Anatolia have had a beneficial effect on agriculture. Cultivators who had been unable to finish their winter sowings profited by the rains, which enable work in the fields to proceed.

Algeria : Sowing was effected under bad conditions due to the persistence of dry weather ; the greatly delayed rains did not fall until December 16. The areas sown on January 1 are also exceptionally reduced except in the case of rye, cultivation of which seems to be extending. Part of the sowings effected before the rains of December 15 will have to be re-sown. Sprouting has been irregular.

Egypt : On 1 January crop condition of wheat and that of barley were 100, as on the same date last year.

Tripolitania : Autumn sowings have been effected under good conditions.

Union of South Africa : In most parts of the Union yields of winter cereals have been detrimentally affected by the droughty spring as well as by rust. The Transvaal, however, where a considerable quantity is produced under irrigation, has suffered comparatively little, the continuous dry weather having, on the contrary, assured excellent yields in the irrigated areas, the wheat crop, with an increase of 57 % over last season,

establishing a record. As regards wheat the Orange Free State has suffered most, the estimate showing a decrease of 34 %, the decrease in the Union as a whole being 8 %. The very marked decrease in oats and barley production is due not only to the above-mentioned causes but to the smaller acreage planted due to the unsatisfactory prices for these cereals during the past year.

Australia. (Telegram of 14 January) : In December weather conditions were unfavourable to harvesting. In New South Wales, Victoria and Western Australia weather was boisterous, with heavy rain and some hail and it is anticipated that yields will be affected in the first two States on account of lodging and of shedding of the grain while some bleaching is also reported ; Western Australia, however, despite weather conditions expects a record yield. Areas not affected by the intemperate weather anticipate good to record yields. In South Australia there is no alteration in the cereals outlook. Owing to the weather conditions harvesting has been generally delayed.

MAIZE

United States : The latest statistics of area and production of maize for grain, silage, hogging down, grazing and fodder in 1930 compared with 1929 and the average, are as follows :

	1930	1929	Average 1924-28	Percentages 1930 1929 = 100	Average = 100
Area (thousand acres)					
Maize for grain	84,701	82,668	84,569	102.5	100.2
Maize for silage	4,766	4,306	4,252	110.7	112.1
Maize for hogging, down, grazing and fodder . .	11,362	10,882	11,379	104.4	99.9
Production (thousand centials)					
Maize for grain	976,525	1,228,367	1,259,506	79.5	77.5
Maize for silage	579,120	599,740	612,120	96.6	94.6
(thousand bushels)					
Maize for grain	1,743,795	2,193,512	2,249,117	79.5	77.5
(thousand short tons)					
Maize for silage	28,956	29,987	30,606	96.6	94.6

Indo-China : The crop was very good in Cochin-China and good in Cambodia, where rapid growth prevented the development of insect pests.

Egypt : Crop condition of nili on 1 January was 101 as on 1 December and on 1 January 1930.

Maize.

COUNTRIES	AREA					PRODUCTION							
	1930	1929	Average 1924 to 1928	% 1929 = 100	Average 1924 = 100	1930	1929	Average 1924 to 1928	1930	1929	Average 1924 to 1928	% 1929 = 100	Average 1929 = 100
1,000 acres					1,000 centals			1,000 bushels of 56 lbs					
Austria . . .	139	138	148	100.9	94.3	2,474	2,586	2,390	4,417	4,017	4,267	95.7	103.5
Bulgaria . .	1,696	1,976	1,577	85.8	107.5	19,075	20,718	13,342	34,062	36,996	23,824	92.1	143.0
Spain . . .	1,072	1,006	1,088	106.6	98.5	15,303	13,884	13,257	27,327	24,794	23,673	110.2	115.4
*France . . .	702	852	849	89.5	80.7	...	11,002	9,358	...	19,646	18,711	...	...
Greece . . .	337	344	502	97.9	67.1	2,694	3,342	3,502	4,810	5,967	6,253	80.6	76.9
Hungary . . .	2,664	2,774	2,599	96.0	102.5	29,303	39,554	39,937	52,328	70,632	71,316	74.1	73.4
Italy . . .	3,737	3,719	3,776	100.5	98.9	66,081	55,789	54,445	118,001	99,624	97,224	118.4	121.4
Rumania . .	10,930	11,840	10,026	92.3	109.1	87,043	140,792	89,232	155,435	251,414	159,343	61.8	97.5
Switzerland .	3	3	3	100.1	96.5	87	89	84	156	159	150	97.5	103.4
Czechoslov. (1)	325	335	346	92.3	—	4,550	5,103	5,351	8,142	9,113	9,556	80.3	—
Yugoslavia . .	6,079	5,883	5,388	103.3	112.8	77,217	91,441	65,801	137,888	163,287	117,501	84.4	117.3
*U. S. S. R. (2)	9,625	8,785	(3) 8,303	109.6	115.9	...	92,815	(3) 79,918	...	165,741	(3) 142,711	...	...
Canada . . .	162	152	203	100.5	79.9	2,680	2,902	4,466	4,801	5,183	7,976	92.6	60.2
United States .	100,820	97,856	100,172	103.0	100.7	1,165,887	1,463,914	1,511,888	2,081,048	2,614,132	2,609,807	79.6	77.1
*Guatemala . .	245	347	330	70.5	74.3	...	2,883	2,351	...	5,059	4,198	...	...
Mexico . . .	7,348	7,228	7,878	101.7	93.3	20,203	33,304	49,233	52,147	59,631	87,917	87.4	59.3
Syria and Leb. .	105	67	120	156.3	87.8	953	922	1,311	1,702	1,647	2,341	103.3	72.7
Algeria . . .	21	23	25	80.4	84.0	116	151	141	207	270	251	76.6	82.5
Fr. Morocco . .	664	600	539	110.7	123.2	2,897	3,055	3,324	5,173	5,455	5,936	94.8	87.1
Tunis . . .	42	49	43	84.9	97.3	132	143	103	236	256	184	92.3	128.2
*Kenya (4) . .	207	246	180	84.0	114.9	...	3,717	2,080	...	6,638	3,730	...	...
Totals . . .	136,162	134,002	134,433	101.6	101.3	1,565,213	1,877,779	1,857,891	2,687,880	3,353,177	3,317,519	80.2	81.0

* Countries not included in the totals. — 1) Main crop. — 2) Secondary crop. — (1) The figure for the averages is not exactly comparable with those of the years 1930 and 1929 owing to changes in the method of making estimates. — (2) For 1930: area sown; for the preceding years: area harvested. — (3) Average 1925 to 1928. — (4) Sown area.

RICE

India: Dry weather continued throughout December and the first week of January in Bengal; reaping of winter paddy was progressing freely at the end of December and outturn of crops was estimated to be satisfactory. In Bihar and Orissa no rain fell in December but there was an occurrence of light to moderate rains in the first week of January; crops are in good condition. After a dry December moderate rain fell at the beginning of January in Madras; crop condition remains unchanged from last month. In the Central Provinces threshing and winnowing of rice are continuing in the feudatory States.

Indo-China: Except in Tonkin, where weather conditions were exceptionally favourable, rice for harvest in the latter half of the year were damaged by drought almost everywhere. In Annam only irrigated crops showed good growth; others everywhere wilted towards the end of the summer. In Cochin-China, the dry weather which retarded transplanting, also slightly injured rice already transplanted. In Cambodia transplanting was greatly delayed and the first growth of transplanted paddy was hindered; the crop was anticipated to be about average. In Laos upland rice was in vigorous condition while lowland rice suffered from lack of water.

Siam: The data of the area in the seven Inner Circles refer to the area harvested. According to a second estimate the area sown is 4,539,000 acres against 4,463,000 in

1929-30 and 4,187,000 on the average of the preceding five years. Percentages : 101.7 and 108.4. In the above-mentioned seven Inner Circles, the main exporting area, the carryover of old crop amounts this year to 9,960,000 bushels (4,480,000 centals) of rough rice. The quantity of new crop available for export is estimated at 87,110,000 bushels (39,200,000 centals) against 68,500,000 (30,830,000) last year (127.2 %).

Rice.

COUNTRIES	AREA					PRODUCTION							
	1930/31	1929/30	Aver. 1924/25 to 1928/29	% 1930/31		1930/31	1929/30	Aver. 1924/25 to 1928/29	1930/31	1929/30	Aver. 1924/25 to 1928/29	% 1930/31	
				1929/30 = 100	Aver- age = 100							1929/30 = 100	Aver- age = 100
1,000 acres					1,000 centals			1,000 bushels of 45 lbs.					
Bulgaria . .	18	22	16	84.5	112.6	435	280	284	967	622	630	155.5	153.5
Spain . . .	120	119	120	100.4	99.7	7,033	6,695	6,707	15,628	14,877	14,905	105.0	104.9
Italy . . .	361	339	349	106.5	103.3	14,333	14,853	14,287	31,850	33,005	31,748	96.5	100.3
*Yugoslavia.	4	4	4	107.9	115.4	...	48	39	...	106	88	...	...
Unit. States	960	868	952	110.6	100.8	18,615	18,208	17,600	41,367	40,462	39,110	102.2	105.8
Formosa . .	1,517	1,403	1,304	108.1	108.8	30,090	25,838	25,857	66,866	57,416	57,458	116.5	116.4
Korea . . .	3,970	4,000	3,857	99.2	102.9	76,746	54,626	59,087	170,543	121,389	131,303	140.5	129.9
*India . . .	78,427	76,962	77,601	101.9	100.9	...	1,064,171	1,047,861	...	2,364,777	2,328,533	...	...
Java and (a)	7,599	7,382	7,343	102.9	103.5	106,818	102,800	105,422	237,368	228,440	234,266	103.0	101.3
Madura (b)	1,201	1,077	1,018	111.5	118.0	10,595	8,929	8,245	23,545	19,841	18,322	118.7	128.5
Japan . . .	7,941	7,868	7,754	100.9	102.4	260,360	237,423	235,121	578,567	527,595	522,480	109.7	110.7
Siam (1) . .	4,004	3,468	3,599	117.2	112.9	65,868	49,287	57,342	146,370	109,524	127,425	133.6	114.9
Totals . . .	21,751	26,546	26,462	104.5	105.1	590,893	518,939	529,952	1,313,971	1,153,171	1,177,647	113.9	111.5

* Countries not included in the totals. — a) Irrigated rice-fields. — b) Not irrigated rice-fields. — (1) 7 Inner provinces which normally contribute about 3/5 of the total production of the country.

POTATOES (*)

Italy : While in some districts preparation of the land for early potatoes is still proceeding, in others sowings have been begun and in some places are already completed!

Argentina : Sowings were carried out under favourable conditions in Buenos Ayres as well as in Santa Fé, and crop condition is good.

Palestine : On light lands, well manured, sowings have already begun.

Tripoli : The season has been exceedingly deficient in rain and the crop has suffered from weevil and rot.

SUGAR SEASON

This year, departing from our usual custom, we are not yet publishing the first estimates of cane-sugar production in 1930-31, owing to the lack of sufficient information for a great many countries to enable even an approximate numerical statement to be made. It seems, however, possible to state that the production of cane-sugar in 1930-31 will be perhaps a little below that of 1929-30 if Cuba limits production to 3-3 1/2 millions as certain interested parties propose. Should, however, Cuba produce without restriction production will be above that of last season.

(1) See table on following page 15.

Potatoes:

COUNTRIES	AREA					PRODUCTION							
	1930	1929	Aver.		% 1930	1930	1929	Aver.		% 1930	1929	Aver.	
			1924	to 1928				1924	to 1928			to 1928	
1,000 acres		= 100 = 100		1,000 centals		1,000 bus. of 60 lbs		= 100 = 100					
Germany (s)	584	582	(1) 593	100.3	98.5	63,223	62,300	(1) 59,837	105,370	103,881	(1) 99,726	101.5	105.7
(d)	6,346	6,423	(1) 6,396	98.8	90.4	975,149	821,253	(1) 809,002	1,025,215	1,308,728	(1) 1,348,810	118.7	120.5
Austria (s)	67	58	42	116.6	150.0	4,058	5,413	5,325	7,754	9,022	5,542	86.1	140.1
(d)	407	411	399	90.0	102.0	49,970	50,384	41,500	83,282	93,971	69,180	88.6	120.4
Belgium . .	400	423	402	94.6	90.4	80,050	86,157	70,158	101,097	143,592	110,927	70.4	86.5
Bulgaria . .	35	27	26	127.3	135.5	1,852	1,671	780	3,086	2,785	1,310	110.8	235.6
Denmark . .	170	158	177	107.8	96.1	22,223	23,633	20,292	37,037	39,388	33,819	94.0	109.5
Spain . . .	953	911	(2) 778	104.6	122.4	92,404	101,013	2) 71,716	154,153	169,852	(2) 110,524	90.8	129.0
Estonia . .	168	152	109	110.3	99.6	17,992	16,093	15,405	29,985	27,671	25,675	108.4	116.8
*Irish Fr. St.	247	363	375	95.6	92.4	67,350	45,928	...	112,249	76,545	...	...	...
Finland . .	175	178	170	98.6	103.2	17,314	17,315	16,117	28,856	28,858	26,861	100.0	107.4
*France . .	3,491	3,644	3,637	95.8	90.0	366,368	310,732	...	610,601	517,877	...	...	...
Eugl. a. W.	423	510	490	81.5	80.3	61,308	80,371	68,277	102,331	133,950	113,790	76.4	89.9
Scotland . .	123	145	143	85.2	86.4	10,273	25,872	20,474	32,122	43,120	34,122	74.5	94.1
*North Irel.	136	152	155	89.8	88.1	...	25,170	23,630	...	41,064	39,397	...	...
Greece . . .	19	10	30	102.6	64.3	656	1,197	904	1,093	1,094	1,507	58.8	72.5
Hungary . .	681	700	634	97.2	107.2	35,694	47,802	40,542	59,488	79,660	67,568	74.7	88.0
Italy . . .	863	867	867	90.6	90.6	42,884	44,263	43,620	71,472	73,770	72,690	96.9	98.3
Latvia . . .	231	204	198	113.3	117.0	22,107	23,805	15,306	36,094	39,674	25,507	93.2	145.0
Lithuania .	403	326	399	123.7	100.3	39,923	40,850	31,428	66,537	68,081	52,379	97.7	127.0
Luxemb. . .	35	43	39	81.2	80.0	3,395	5,283	3,520	5,658	8,804	5,877	64.3	96.3
Malta . . .	7	7	7	106.2	108.7	644	653	550	1,074	1,089	917	98.7	117.0
Norway . .	117	114	120	102.0	97.2	16,047	19,842	17,526	28,245	33,070	29,210	85.4	96.7
Netherl. . .	406	450	425	90.1	95.4	56,831	60,317	67,490	94,716	150,525	112,496	62.0	84.2
Poland . . .	(3) 6,513	6,513	5,987	...	...	638,240	609,065	543,035	1,063,713	1,166,585	905,040	91.2	117.5
Rumania . .	468	514	473	91.2	90.0	38,204	50,484	39,308	63,803	84,138	65,512	75.9	97.4
Sweden . .	347	348	374	98.6	92.8	35,204	42,507	36,412	58,822	70,843	60,685	83.0	96.9
Switzerland	120	119	115	101.2	104.2	13,402	18,298	14,354	22,487	30,497	23,923	73.7	94.0
Czechoslov.	1,750	1,880	1,702	93.1	...	180,208	235,801	176,200	300,401	392,904	293,662	76.5	...
... (4)	...	...	...	...	...	...	...	...	...	...	...	...	...
*U. S. S. R.	(5) 13,171	14,088	6) 13,400	80.7	98.3	...	1,054,915	6) 930,338	...	1,758,157	6) 1,565,532	...	...
Canada . .	575	544	550	105.8	103.5	49,160	39,930	48,091	81,933	66,550	80,150	123.1	102.2
Unit. States	3,394	3,338	3,364	101.7	100.9	216,654	215,429	235,552	361,000	359,048	392,570	100.6	92.0
Syria a. Leb.	17	18	18	93.5	127.7	754	1,274	982	1,257	2,123	1,636	50.2	76.9
Algeria . .	30	29	23	103.4	128.7	1,102	1,055	846	1,837	1,760	1,416	104.4	129.8
*Tunis . . .	4	5	3	75.0	140.2	...	187	89	...	312	149	...	...
*New Zeal.	10	9	9	103.4	105.1	...	2,914	2,812	...	4,857	4,687	...	...
Totals . . .	25,827	26,026	25,131	99.3	102.8	2,778,664	2,677,641	2,512,579	4,631,008	4,795,962	4,191,549	96.6	116.6

* Countries not included in the totals. — s) Early crop. — d) Late crop. — (1) Average 1927 and 1928. — (2) Average 1924 and 1926 to 1928. — (3) Preceding year's figure. — (4) The figure for the average is not exactly comparable with those of the years 1930 and 1929 owing to changes in the method of making the estimates. — (5) For 1930 : area sown; for the previous years : area harvested. — (6) Average 1925 to 1928.

As regards beet-sugar the latest news to hand indicates for almost all the beet countries of Europe an increase on the estimate published last month.

In the table annexed are assembled the quotations for New York, London, Paris and Hamburg for the year 1930.

In 1930, as in preceding years, the conditions of crisis that have so long overclouded the sugar market continued. In the early part of January the slow but uninterrupted fall of prices, already begun in 1929, after the maximum of that year had been reached in September, continued. In the third decade of January there was an unexpected decline, due probably to the publication of the most recent data of European beet-sugar production, which gave figures above the preceding. Prices then recovered under the influence of Cuban news of a production in that island apparently inferior to that expected; they

Sugar Prices.

DATE	NEW YORK	LONDON	PARIS	HAMBURG
	Cuba centrifugals 96° C and F cents per lb.	Granulated, duty free, shill. per 112 lbs.	No. 3. No. 3 Crystallized frs. per 100 Kgs.	White marks per 50 Kgs.
8 January 1930	2.063	23/0	248.00	9.20
15 "	2.000	23/0	240.50	8.95
22 "	1.844	22/2	230.50	8.00
29 "	2.000	22/0	239.00	8.95
5 February	2.000	22/3	—	—
12 "	2.000	22/0	240.50	9.00
19 "	2.000	22/0	240.00	8.75
26 "	1.813	22/0	238.00	8.40
5 March	1.844	21/8	238.50	8.30
12 "	1.844	22/0	238.00	8.60
19 "	1.813	21/11	235.50	8.35
26 "	1.781	21/11	235.00	8.45
2 April	1.844	22/2	237.00	8.40
9 "	1.625	22/2	236.00	8.15
16 "	1.656	22/2	240.00	8.40
23 "	1.656	22/2	239.00	8.10
30 "	1.625	21/11	234.50	7.70
7 May	1.500	21/11	231.00	7.60
13 "	1.438	21/5	231.50	7.15
21 "	1.438	21/7	234.00	7.00
28 "	1.375	21/10	234.50	7.50
4 June	1.409	21/7	234.50	7.00
11 "	1.409	21/7	232.00	7.70
18 "	1.237	21/10	231.00	7.65
25 "	1.267	21/8	227.50	7.60
2 July	1.207	21/10	225.50	7.40
8 "	1.207	21/10	223.50	7.30
16 "	1.250	21/2	221.00	7.10
23 "	1.250	21/2	226.00	7.10
30 "	1.180	—	222.75	—
5 August	1.230	21/2	227.50	—
13 "	1.180	21/2	223.50	6.70
20 "	1.160	21/2	213.00	6.70
27 "	1.180	21/2	213.50	6.00
3 September	1.160	20/8	212.00	6.65
10 "	1.130	20/2	202.00	6.55
17 "	1.150	19/10	199.50	6.60
24 "	1.130	19/2	199.25	—
30 "	1.040	18/11	188.00	5.70
8 October	1.220	19/2	195.75	—
15 "	1.300	19/5	202.00	6.90
22 "	1.400	19/8	203.50	6.85
30 "	1.380	20/8	203.00	7.30
5 November	1.390	20/5	200.50	7.15
11 "	1.420	20/3	201.50	7.10
19 "	1.370	19/9	192.00	6.50
25 "	1.400	19/3	195.50	6.30
3 December	1.340	19/6	196.50	6.50
10 "	1.370	19/9	194.00	6.65
17 "	1.250	20/0	189.50	6.45
23 "	1.230	20/0	178.50	6.00
30 "	1.140	19/6	178.50	5.90

remained more or less firm for some weeks, only to decline again. This renewed fall of prices was also influenced by the first estimates of European beet area, placing the latter at a higher level than that cultivated in 1929; and perhaps also by the rumours of the impending dissolution of the Cuban Selling Agency, the organ of control of sugar sales abroad. When, therefore, on 14 April, the Cuban Agency was actually dissolved the markets did not experience any violent shock such as might have been expected. The decline of prices continued day by day save for slight and momentary recoveries when rumours, well founded or otherwise, circulated in the markets. Thus there was a weak recovery on the announcement of some sales to the U. S. S. R. and when talk arose of probable restriction of exports in Europe, Cuba and Java. But the downward movement was not arrested and continued steadily, keeping pace with the fresh news concerning favourable conditions for sugar-beet production in Europe, the United States and Canada, until at

the end of the September, with the first definite news of an abundant beet crop in almost all the producing countries and particularly in the U. S. S. R., quotations reached the lowest level of recent years. But, when it appeared that the downward movement would have no limit, prices recuperated for a spell, whether by natural reaction or by the adoption of the plan of Thomas L. Chadbourne for the immediate withdrawal from the market of 1 ½ million tons of Cuban sugar. Possibly, though to a minor degree the tendency to recovery was also the result of the rumours that Java would limit its 1931-32 crop. Under these more favourable circumstances quotations rose gradually until the first decade of November. Meanwhile a conference at Brussels for the limitation of exports, in which there took part Germany, Belgium, Hungary, Poland, Czechoslovakia, Cuba and Java, was being prepared. At the end of December the conference had not, contrary to the expectations of many, had any result, owing to Germany's refusal at Brussels to accept the export quota allotted to her. This fact, together with the publication of revised estimates of beet-sugar production above the previous estimates, caused the atmosphere of optimism created by the Chadbourne plan to be in part dissipated. Thus the gradual fall in prices was renewed and the year closed without the sugar producers having found the means for regulating the markets according to their wishes.

* * *

The figures in the following table are supplied by the " Association Internationale Sucrière " of Vienna.

COUNTRIES	Sugar Beet		Raw Sugar	
	1930	1929	1930-31	1929-30
	Centals			
Germany	349,524,000	263,159,140	55,310,600	43,754,480
Austria	21,417,120	15,172,200	3,352,710	2,054,180
Belgium	41,395,480	37,612,030	6,221,580	5,532,410
Bulgaria	8,800,000	5,406,000	1,271,000	882,380
Denmark	22,648,000	17,591,000	3,699,000	2,961,000
Irish Free State	3,395,000	3,161,000	567,000	511,000
Finland	697,680	515,180	94,580	62,040
Hungary	34,050,270	35,049,010	5,164,520	5,441,710
Italy	73,507,000	68,308,230	9,084,200	9,597,040
Poland	100,383,170	111,401,120	17,086,000	20,223,030
Sweden	26,125,170	16,531,680	4,115,400	2,076,490
Czechoslovakia	148,724,000	122,412,500	24,936,970	22,824,200
Turkey in Europe	1,257,000	668,999	214,000	120,920
Yugoslavia	17,600,000	23,150,000	2,200,000	2,659,410
Total	849,523,890	720,229,040	133,317,620	119,906,280
	Short tons			
Germany	17,476,000	13,157,778	2,765,495	2,187,694
Austria	1,070,841	758,600	167,033	132,707
Belgium	2,069,746	1,880,621	311,075	276,617
Bulgaria	430,000	274,800	63,510	44,118
Denmark	1,132,400	879,500	185,000	148,000
Irish Free State	170,000	158,000	28,300	25,600
Finland	34,883	25,750	4,729	3,102
Hungary	1,702,490	1,752,427	258,223	272,082
Italy	3,675,000	3,415,365	454,200	479,846
Poland	5,019,090	5,599,980	854,390	1,011,138
Sweden	1,306,241	826,573	205,767	183,823
Czechoslovakia	7,436,000	6,120,542	1,246,831	1,141,195
Turkey in Europe	62,800	33,449	10,700	6,046
Yugoslavia	881,000	1,157,000	110,000	132,970
Total	42,476,491	36,616,394	6,665,893	5,994,938

* * *

France : In the period from 15 December to 7 January there was less than a week of dry cold weather and carting of roots was very difficult; lifting is now quite at an end

but some transport to the factories remained to be carried out and the campaign will not be finished for a month. The prolonged delay of a portion of the crop on the wet land and the storing of another portion in silos during the rainy weather can have had no other effect than a diminution in sucrose content

Great Britain and Northern Ireland : The average sucrose-content of the beets worked up to the end of December was 17.1 % against 17.7 % at the same date last season. With the prevalently wet weather of the past autumn some decrease was to be expected, other factors being equal.

Production of Beet Sugar (raw).

COUNTRIES	Production 1-September 31-December				Total production during the season						% 1930-31	
	1930-31	1929-30	1930-31	1929-30	1930-31 (1)	1929-30	Average 1924-25 to 1928-29	1930-31 (1)	1929-30	Average 1924-25 to 1928-29	1929-30 = 100	Average = 100
	thousand centals		short tons		thousand centals		short tons		short tons			
	thousand centals	short tons	thousand centals	short tons	thousand centals	short tons	thousand centals	short tons	thousand centals	short tons		
Germany	(2) 38,381	(2) 33,237	(2) 1,001,041	(2) 1,001,842	55,311	43,754	36,885	2,765,495	2,187,694	1,844,210	126.0	150.0
Austria	2,932	2,519	146,584	125,949	3,353	2,654	1,986	167,700	132,700	99,307	126.0	160.0
Belgium	—	—	—	—	5,053	5,409	6,506	300,000	273,430	329,701	109.0	90.0
Bulgaria	1,084	816	54,190	40,800	1,146	816	617	57,000	40,800	30,836	140.0	186.0
Denmark	—	—	—	—	3,082	2,954	3,337	181,000	147,708	166,840	125.0	110.0
Spain	—	—	—	—	6,125	1,880	4,955	306,260	244,017	217,731	125.0	124.0
Irish Free State	349	300	17,413	18,019	562	511	411	28,100	25,557	20,563	110.0	137.0
Finland	—	—	—	—	82	56	60	4,079	2,790	3,017	140.0	135.0
France	(3) 17,087	(3) 15,242	(3) 854,330	(3) 762,090	24,251	20,084	17,667	1,200,000	1,004,000	883,345	121.0	137.0
Great Britain	8,432	6,480	421,587	324,004	9,480	6,509	2,923	470,000	325,437	140,158	146.0	324.0
Hungary	(2) 4,249	(2) 3,081	(2) 212,434	(2) 199,025	4,886	5,442	4,180	244,293	272,083	209,472	90.0	117.0
Italy	7,503	8,031	379,029	446,522	8,920	9,503	6,927	416,000	475,120	346,353	94.0	129.0
Latvia	—	—	—	—	265	187	(4) 44	13,228	9,348	(4) 2,265	141.0	600.0
Netherlands	(2) 4,984	(2) 4,381	(2) 240,181	(2) 219,043	6,383	5,723	6,477	329,000	286,170	323,827	112.0	90.0
Poland	(2) 10,673	12,135	535,637	606,738	16,535	20,192	13,029	830,000	1,009,597	651,433	82.0	127.0
Rumania	—	—	—	—	2,866	1,813	2,778	140,000	90,640	138,875	158.0	103.0
Sweden	—	—	—	—	3,748	2,678	2,940	187,391	133,884	146,984	140.0	127.0
Switzerland	—	—	—	—	90	90	151	5,000	4,940	7,572	100.0	65.0
Czechoslovakia	24,680	22,333	1,231,087	1,116,638	24,637	22,822	27,747	1,246,831	1,141,075	1,387,334	109.0	90.0
Turkey	—	—	—	—	214	121	(4) 70	10,700	6,046	(4) 3,780	177.0	283.0
Yugoslavia	—	—	—	—	2,205	2,680	2,007	100,000	134,299	100,369	82.0	110.0
<i>Europe totals</i> a)	—	—	—	—	181,022	158,953	141,802	9,026,077	7,947,335	7,090,011	114.0	128.0
U. S. S. R.	29,832	—	1,491,550	—	30,022	18,140	22,064	1,950,000	907,000	1,103,202	215.0	177.0
<i>Europe totals</i> b)	—	—	—	—	220,044	177,093	163,866	10,976,077	8,854,335	8,193,213	124.0	134.0
Canada	—	—	—	—	—	848	789	—	39,431	40,295	120.0	118.0
United States	—	—	—	—	26,932	23,136	22,973	1,346,500	1,157,000	1,148,025	116.0	117.0
<i>Totals North America</i>	—	—	—	—	27,880	23,925	23,779	1,343,899	1,196,431	1,188,920	117.0	117.0
* Korea	—	—	—	—	—	16	11	—	814	564	—	—
* Japan	—	—	—	—	—	600	479	—	30,000	23,920	—	—
<i>General totals</i> (a)	—	—	—	—	208,902	182,878	165,581	10,419,976	9,143,766	8,278,931	114.0	126.0
<i>General totals</i> (b)	—	—	—	—	247,924	201,018	181,645	12,369,976	10,456,766	9,382,133	123.0	132.0

* Countries not included in the totals. a) Not including U.S.S.R. — b) Including U.S.S.R. — (1) Approximate data. — (2) Production at the end of November. — (3) Production at 15th December. — (4) Average 1926-27 to 1928-29.

Italy : In some provinces preparation of the land is still in progress while in others it has already been almost completed.

United States : At the end of December results from the grinding of sugar cane in Louisiana were reported to be good.

Porto Rico : Weather conditions at the middle of December favoured the sugar crop, harvesting of which was about to begin. Prospects pointed to a crop of about 10 % less than the record yield of last season.

India : There was a continuance of dry weather throughout December in the United Provinces causing a need for rain in some districts ; general rain fell however, at the begin-

Sugar Beet.

COUNTRIES	AREA					PRODUCTION											
	1930	1929	Aver. 1924 to 1928	% 1930		1930	1929	Aver. 1924 to 1928	1930	1929	Aver. 1924 to 1928	% 1930					
				1929	Aver.							1929	Aver.				
														= 100	= 100	= 100	= 100
1,000 acres					1,000 centals				1,000 short tons								
Germany	1,104	1,125	1,032	100.1	115.6	328,900	244,524	233,482	16,445	12,226	11,674	134.5	140.9				
Austria	82	75	60	108.7	145.4	17,756	15,239	12,586	888	762	629	116.5	141.1				
Belgium	137	143	174	96.2	79.0	42,877	34,020	44,756	2,144	1,731	2,238	123.8	95.9				
Bulgaria	49	48	38	101.5	127.0	6,889	5,782	4,873	344	280	244	119.1	141.4				
Denmark	84	80	96	103.5	82.3	24,361	19,998	24,356	1,218	1,000	1,218	121.8	100.0				
Spain	209	151	239	138.0	87.3	50,706	35,252 (1)	35,206	2,535	1,763 (1)	1,700	143.8	144.0				
*Irish Free State	14	13	(2) 15	110.3	98.5	...	3,162 (2)	2,600	...	158 (2)	135	...	...		
Finland	3	4	5	73.5	64.0	683	560	685	34	28	34	122.0	99.7				
*France	646	607	563	106.4	114.7	...	118,202	119,143	...	5,910	5,957	...	...		
England and Wales	347	230	120	150.8	283.3	67,200	44,778	20,207	3,360	2,239	1,010	150.1	332.6				
Scotland	2	1	4	271.4	46.5	278	91	530	14	5	26	305.3	52.5				
Hungary	185	195	162	94.5	113.6	31,868	35,429	31,480	1,593	1,771	1,574	89.9	101.2				
Italy	272	287	230	94.9	118.6	66,600	64,467	54,978	3,330	3,223	2,740	103.3	121.1				
Netherlands	142	136	166	104.5	85.3	41,101	45,424	47,955	2,055	2,271	2,308	90.5	85.7				
*Poland	464	590	473	78.6	98.1	...	109,579	84,418	...	5,479	4,221	...	...		
Rumania	113	122	169	92.8	66.0	15,503	19,680	24,056	775	984	1,203	78.8	64.4				
Sweden	97	72	84	133.8	115.0	25,671	16,907	19,884	1,284	845	994	151.8	129.1				
Switzerland	3	3	4	103.3	82.7	970	800	1,061	49	43	53	112.8	91.4				
Czechoslovakia (3)	614	609	700	100.8	...	136,225	136,889	136,418	6,811	6,844	8,321	99.5	...				
*Yugoslavia	148	147	109	100.3	135.9	...	24,197	10,286	...	1,210	814	...	...		
U. S. S. R.	2,533	1,890	1,426	134.0	177.6	308,648	138,902	173,582	15,432	6,044	8,670	222.2	177.8				
Canada	53	43	44	121.9	110.4	9,720	7,280	8,565	486	364	428	133.5	113.5				
United States	709	688	701	116.1	114.0	183,500	146,300	147,780	9,175	7,318	7,889	125.4	124.2				
Totals	6,918	5,902	5,450	117.3	126.9	1,350,456	1,013,032	1,052,449	67,972	50,650	52,621	134.2	129.3				

* Countries not included in the totals. — (1) Average 1924, 1926 to 1928. — (2) Average 1926 to 1928. — (3) The figures for the averages are not exactly comparable owing to changes in the method of making the estimates.

ning of January. There was further local damage by insects and frost, but crops were generally doing well and prospects remained favourable. In the Punjab weather during December was predominantly dry except for light and scattered falls at the end of the month and rain is badly needed; otherwise conditions remain about the same as reported last month. No rain fell during December in Bihar and Orissa but light to moderate rains were recorded at the beginning of January; sugar cane is in good condition. Dry weather was favourable in Bengal.

Palestine : Yields of cane are very good and it has already been marketed.

Syria and Lebanon : Crop condition is good, 100 in the Syrian State and 90 in the Government of Latakia.

Egypt : The crop condition of sugar cane on January 1 was 103 against 102 on December 1 and 101 on January 1, 1930.

Union of South Africa : In November crop condition was 7 % below normal. In some districts weather was favourable, in others drought was experienced. Data from a special sugar census will be available at the end of January.

Hawaii : Early reports at the end of December indicated a heavy tonnage of sugar cane but the sucrose of the juice was low because heavy rains and high temperatures have kept the cane growing.

VINES

The wine market situation at the beginning of the season 1930-31 in France, Italy, the Iberian Peninsula and North Africa.

Sufficient information is now at our disposal to allow the following survey to be made of the situation on the wine markets of the principal countries, beginning with a study of each principal producing country of Western Europe and North Africa.

France: The situation at the beginning of the season 1930-31 was marked by two phenomena which were partly compensatory: 1) the very small quantity produced; 2) the exceptional importance of stocks from previous production in the hands of producers and merchants. To obtain an exact idea of the supplies at the disposal of the French trade, account must also be taken of imports of Algerian wine entering free of duty. These imports depend on both the French and the Algerian production; this year, for the first time since the war a bad French crop has coincided with a very good Algerian crop; previously the coincidence of similar crops in the two countries had been a general phenomenon. While therefore, one may estimate that in a year of good production for the two countries, the quantity of Algerian production not exported to France is 40-50 million Imperial gallons (50-101 million American gallons) of wine, while in bad years the quantity is a little less than 20 million Imperial gallons (30 million American gallons), no precedent is possessed for judging the possible results in a year such as the present one. The production deficit in France and the general popularity of making shipments in the early months of the season permit the estimate that of 286 million Imperial gallons (343 million American gallons) produced, Algeria will ship about 231-264 (277-317). The total supplies for the French trade are estimated as follows for the current season and compared in with the figures for previous years.

TABLE I. — *France. Supplies of wine.*

Season 1 October-30 September	1930-31	1929-30	1928-29	1927-28	1926-27	1925-26
(Thousand Imperial gallons).						
Supplies in hands of growers (declared crop + stocks)	1,000,216	1,502,235	1,310,545	1,123,965	970,444	1,485,869
Commercial Stocks on 1 September	273,210	242,083	199,496	107,120	241,973	244,501
Import from Algeria (1 October-30 September)	(1) 230,974	232,140	202,201	159,218	156,953	200,244
Total national supplies	1,564,000	1,976,000	1,721,000	1,480,000	1,369,000	1,931,000
Imports from foreign countries	—	70,304	79,455	125,276	82,293	37,066
Total supplies	—	2,046,000	1,800,000	1,605,000	1,451,000	1,969,000
(Thousand American gallons).						
Supplies in hands of growers (declared crop + stocks)	1,273,224	1,804,049	1,584,655	1,340,781	1,165,416	1,784,305
Commercial stocks on September	328,100	290,720	239,576	236,723	290,588	293,732
Import from Algeria (1st October-30 September)	(1) 277,379	278,779	242,826	191,207	188,486	240,475
Total national supplies	1,879,000	2,374,000	2,067,000	1,778,000	1,644,000	2,319,000
Imports from foreign countries	—	84,429	95,418	150,445	98,826	44,513
Total supplies	—	2,458,000	2,162,000	1,928,000	1,743,000	2,364,000

(1) Estimated figure.

From this table it is seen that home supplies for this year are normal. With reference to foreign contributions it must be taken into consideration that exports from Spain and Tunis to France during the first few months of the season were rather high.

In the following table are given the data of consumption in previous years.

As may be seen, supplies are definitely adequate to meet the needs of the market, even if home consumption is maintained at the level of last year and a development takes

TABLE II. — *Consumption and export of wine.*

Season 1 October-30 September	1929-30	1928-29	1927-28	1926-27	1925-26
	(Thousand Imperial gallons)				
Taxed consumption	1,097,854	1,015,759	976,933	974,689	1,174,251
Consumption free of tax	411,420	342,018	294,195	226,267	373,584
Export	21,338	25,011	24,901	40,366	40,409
Total	1,531,000	1,383,000	1,296,000	1,241,000	1,588,000
	(Thousand American gallons)				
Taxed consumption	1,318,424	1,219,835	1,173,209	1,170,514	1,410,170
Consumption free of tax	494,079	410,738	353,302	271,726	448,641
Export	25,625	30,036	29,904	48,475	48,528
Total	1,838,000	1,661,000	1,556,000	1,491,000	1,907,000

place in exports, predictions which are difficult to make ; it is known that the increase in home consumption last year was caused by a rather large fall in wine prices which have since risen to the quotation of 15-18 francs the degree hectolitre ; moreover, these quotations are too high above the level of the international market to lack a restrictive effect on the export trade.

The opening of the season was in fact marked by a slight reduction in taxed consumption, which however, remains rather high, and by the relatively very low quantity of wine placed on the market by producers ; deliveries from the wine stores of producers since the beginning of the season until the end of November are less by over 44 million Imperial gallons (53 million American gallons) than in 1929 (150 million Imperial gallons or 180 million American gallons compared with 195 Imperial gallons or 234 American gallons) ; they are smaller by nearly one-half than in 1928 (293 Imperial gallons or 352 American gallons) and in 1927 (249 Imperial gallons or 299 American gallons). The trade is showing a decided tendency to obtain supplies from Algeria and foreign sources due to the high prices on the French market. As the firmness of quotations appears to be established at least for some time, it is to be feared that this tendency will be accentuated, the more so as the consumer is becoming accustomed to foreign wines ; it is also to be feared that taxed consumption will diminish in the following months. It may therefore be anticipated, unless a drop in quotations occurs in the near future, that not only will the needs of the French market be largely covered but also there will remain at the end of the season a rather important surplus of production, principally in the form of producers' stocks.

Italy : In contrast to France, which is the principal producing country but having an excess of consumption over production, Italy has a slight excess of production. Exports, however, are relatively small and much more influenced by the attraction of the markets in their export markets than by the magnitude of home supplies. The most important factor in the disposal of the production is therefore here also home consumption. It is impossible, in view of the present state of Italian statistics to determine, even approximately, this consumption or, with more reason, the stocks remaining at the end of the season in the hands of merchants or producers. It is evidently possible to calculate, as has been done in the following table, the apparent consumption : production + imports — exports. We have also given the only accurate figures contained in Italian statistics of wine consumption : the quantities on which the octroi tax on entry into the communes, has been paid ; although the " dazio consumo ", being abolished in the so-called " open " communes in 1927, furnishes only fragmentary information, these figures give a general indication and show a fairly large constancy of consumption in the communes to which they refer.

TABLE III. — *Italy. Apparent consumption of wine.*

Season : October- 30 September	1930-31	1929-30	1928-29	1927-28	1926-27	1925-26	1924-25
(Thousand Imperial gallons)							
Production	701,912	905,529	1,029,901	784,213	815,383	997,968	983,598
Export	—	21,382	21,778	21,382	22,262	24,175	40,453
Import	—	352	308	264	330	286	264
Apparent consumption.	—	884,000	1,000,000	763,000	793,000	974,000	943,000
(Thousand American gallons)							
Production	951,015	1,087,459	1,236,927	941,760	979,202	1,198,464	1,181,213
Export	—	25,677	26,153	25,677	26,784	29,032	48,581
Import	—	423	370	317	396	343	317
Apparent consumption.	—	1,062,000	1,211,000	916,000	953,000	1,170,000	1,133,000

As far as can be judged from these figures, it is seen that on the one hand the quantity of wine placed on the market remains nearly constant in both good and bad years ; and that on the other hand the exports have diminished in recent years, as well as, probably, the production of alcohol. Given that the two previous crops were abundant, it was to be anticipated that there would remain at the end of last season rather large stocks in the hands of both merchants and producers. Informations received from the different viticultural regions at vintage time have confirmed these predictions ; it seems that these stocks have not even yet been exhausted at the present time.

Although production this year is poor, one is led to think that the deficit is largely compensated by the surplus from old production. It is certain that total supplies would exceed the needs of the home market by a rather large amount if they did not comprise a rather large proportion of wines of low degree and low sale value. The Italian trade has already begun an attempt to dispose of part of its supplies abroad especially the better priced qualities. In fact, the relatively not very high prices, for both production and consumption, could only have the beneficial result of creating an outlet for the production on the home and foreign markets. The season however began and continues under conditions of calm.

Spain : The Spanish wine market is for export ; there have been rather important reductions in exports in the last few years.

It must be observed however that the figures of 1925-26 and 1924-25 were again reached in the season 1929-30. It is also interesting to note that the exports of fine wines have been maintained and have even shown an increase in 1929-30. Moreover, shipments have not been reduced to all countries of destination, nor in the same proportions.

Exports to Great Britain, Italy and Latin America show a rather continued diminution although the figures for 1930 are still incomplete ; it must be noted that wines shipped to Italy traverse practically the whole of the country in transit. For Belgium and the Netherlands there is to be noted a recovery or a halt in the decrease of shipments. For Germany, the figure of exports is in close relation to the magnitude of the production. As regards France by far the best customer, the reduction in imports of Spanish wines may in part be attributed to the French Finance Law, which

TABLE IV. — *Spain. Apparent consumption of wine.*

Season 1 October- 30 September	1930-31	1929-30	1928-29	1927-28	1926-27	1925-26	1924-25
(Thousand Imperial gallons)							
Production	365,150	549,895	485,816	623,081	346,549	587,291	478,337
Export	—	66,081	95,777	124,814	104,488	65,223	66,895
Apparent consumption	—	484,000	390,000	498,000	242,000	522,000	411,000
(Thousand American gallons)							
Production	438,524	660,374	583,421	748,264	416,175	705,283	574,439
Export	—	79,387	115,020	149,891	125,481	78,327	80,384
Apparent consumption.	—	581,000	468,000	598,000	291,000	627,000	494,000

prohibits the diluting of home-grown wines with foreign ; however, it is will be seen from the following table that this import is fairly closely related to the amount of national production available on the French market.

TABLE V. — *Export of Spanish wines by countries.*

YEARS	1930	1929	1928	1927	1926
Thousand Imperial gallons.					
France	35,022	55,720	102,610	78,949	31,668
Morocco (French and Spanish)	3,454	3,696	2,090	2,618	3,564
Great Britain	2,310	3,586	2,838	3,630	4,488
Germany	3,696	3,718	4,531	7,589	3,806
Netherlands	3,794	3,080	3,234	3,454	3,388
Italy	1,716	3,146	4,466	3,256	3,410
Belgium	2,596	2,046	1,474	2,596	2,904
Cuba	968	1,540	1,892	1,936	2,574
Argentina	440	688	704	770	748
Thousand American gallons					
France	43,139	66,914	123,236	94,811	41,633
Morocco (French and Spanish)	4,147	4,438	2,510	3,144	4,280
Great Britain	2,774	4,306	3,408	4,359	5,389
Germany	4,438	4,464	5,442	9,114	4,570
Netherlands	3,355	3,608	3,883	4,147	4,068
Italy	2,061	3,778	5,363	3,910	4,095
Belgium	3,117	2,457	1,770	3,117	3,487
Cuba	1,162	1,849	2,272	2,325	3,061
Argentina	528	766	845	925	898

In the first months of the current season there will be noted a very distinct recovery in French imports of Spanish wines. Spanish exports of Mistelles during the same period have been very important ; this fact shows clearly that the French wine trade is largely supplied at the beginning of the season on the Spanish market owing to the difference in price.

On the other hand it is known that at the beginning of the current season crop surpluses in the hands of growers were extremely small. Commercial stocks were, on the contrary, rather high. These considerations lead to the supposition that the Spanish wine trade, despite the quietness of the beginning of the season and the firmness of prices at a somewhat high level, will be able fairly satisfactorily to secure the marketing of the output, which is not great.

TABLE VI. — *Trade in Spanish wines to France.*

Season 1 Oct.-30 Sept.	1930-31	1929-30	1928-29	1927-28	1926-27	1925-26
	(Thousand Imperial gallons)					
Spanish production	365,159	549,895	485,816	623,081	346,549	587,291
French national supplies (1)	1,575,000	2,000,000	1,720,000	1,480,000	1,368,000	1,931,000
Import of Spanish wines into France	21,624	46,670	46,670	74,110	61,373	15,662
Import of Spanish wines in October	5,895	2,200	6,021	1,050	418	1,584
	(Thousand American gallons)					
Spanish production	438,524	660,374	583,421	748,264	416,175	705,283
French national supplies (1)	1,891,000	2,401,000	2,066,000	1,778,000	1,643,000	2,319,000
Import of Spanish wines into France	25,968	56,057	56,057	88,969	73,704	18,809
Import of Spanish wines in October	7,080	2,642	7,952	1,081	502	1,902

(1) Including imports from Algeria.

Portugal : Like Spain, Portugal is classed among the surplus countries. Judging by the following table the wine trade has been affected less seriously by the general crisis than the Spanish trade.

TABLE VII. — *Portugal. — Production and Export.*

Year	1930	1929	1928	1927	1926	1925
	(Thousand Imperial gallons)					
Production of previous year	146,746	100,683	206,183	81,875	126,750	114,981
Export: January to December . . . (1)	15,160	20,788	33,238	16,960	20,370	22,525
Import of Portuguese wines to Great Britain:						
Season 1 October-30 September . . .	5,411	5,631	5,499	7,501	7,523	8,020
	(Thousand American gallons)					
Production of previous year	176,228	120,911	247,607	98,324	152,215	138,082
Export: January to December . . . (1)	18,201	24,964	39,916	20,368	24,462	27,051
Import of Portuguese wines to Great Britain:						
Season 1 October-30 September . . .	6,499	6,703	6,804	9,008	9,035	9,642

(1) January to November. Corresponding data for 1929: 18,544 thousand Imperial Gallons; 22,270 thousand American Gallons.

In the above table have been given the imports of Portuguese wines into Great Britain, the chief customer. From these it appears that there has been a slow but continuous decline which seems to have become still more marked in the first months of the current season. The Portuguese wine trade is seen then, to be experiencing now the reaction to the crisis, especially marked for it by the restriction of the British market. However, this year's crop seems to have been rather a poor one and it is possible that it will be absorbed normally.

North Africa : Algeria and Tunis have had very abundant crops but they are this year finding in France a market sufficient to absorb their production. Already it is reported that there is almost no wine left in the cellars of the Algerian growers; Tunis has obtained the concession of free importation into France of 1,099,877 Imperial gallons (1,320,854 American gallons) of wine in place of 131,985 Imperial gallons (158,502 American gallons) of pure vinous alcohol, which brings the quota admitted free into France up

to 13,198,530 Imperial gallons (15,850,248 American gallons). It must, however, be noted that the total import of Tunisian wine to the metropolis generally greatly exceeds this figure. This year the North African wine trade has escaped the crisis of overproduction thanks to the exceptionally poor crop in France.

Conclusion : The study of the situation in the principal producing countries above-indicated shows that available supplies are largely sufficient for the needs of trade, but that they will not be sufficiently abundant, in view of the generally poor crop, to provoke a crisis of overproduction. This explains the fact that on all markets prices, after a slight tendency to fall at the end of December, show a pronounced firmness.

* * *

Austria : The crop condition of vines on January 1 this year was 1.8 compared with 2.0 on December 1 and 2.3 on January 1, 1930.

France : Our estimate of last month, which was for a very poor crop, has been fully confirmed by the result of the crop declarations. It must, however, be noted that the number of vine-growers making declarations has diminished by more than 10% (173,000 at least) in respect to last year and that the area in production of which the crop has been declared also shows a regression, remaining, however, distinctly superior to that of 1928, a year of good crop. This double decrease is explained by the increase in the number of growers without a surplus to market and consequently without the obligation to make a declaration. It was estimated in July that the area of vineyards in bearing was nearly 3,950,000 acres, so that there should be at least 500,000 acres producing just sufficient for consumption on the holding. In the following table are given the two series of figures of area and production.

	1930	1929	1928	1927
		(thousand acres).		
Area declared (Ministry of Finance) . .	3,464	3,558	3,413	3,393
Total area in bearing (Statistique Agricole				
Ann.)	3,949	3,949	3,709	3,721
Difference between these figures . . .	484	390	297	329
Production declared : 000 Imp. galls. .	924,139	1,383,668	1,284,987	1,082,851
000 Amer. galls. .	1,109,808	1,661,661	1,543,154	1,300,407
	1926	1925	1924	1923
		(thousand acres).		
Area declared (Ministry of Finance) . .	3,343	3,568	3,605	3,509
Total area in bearing (Statistique Agricole				
Ann.)	3,702	3,810	3,830	3,798
Difference between these figures . . .	358	242	225	289
Production declared : 000 Imp. galls. .	897,236	1,380,720	1,494,712	1,483,735
000 Amer. galls. .	1,077,500	1,658,121	1,795,014	1,781,832

From this table there results : (1) an increase of the total area in bearing ; (2) an increase of the undeclared area, reserved exclusively for the supply of family needs, which is out of proportion to the difference that might be due to a more or less abundant crop. This fact deserves emphasis for it indicates an extension of the area of hybrid vines ; the quantity undeclared has increased between the years 1923-24 and the years 1927-28

Vines.

COUNTRIES	AREA					PRODUCTION							
	1930	1929	Aver. 1924 to 1928	1930		1930	1929	Aver. 1924 to 1928	1930	1929	Aver. 1924 to 1928	% 1930	
				1929	Aver.							1929	Aver.
1,000 acres			= 100 = 100	1,000 Imperial gallons			1,000 Americ. gall.			= 100 = 100			
*Germany. .	208	201	202	100.9	100.6	...	44,422	34,601	...	53,347	41,552	...	...
Austria . .	81	85	94	95.8	85.8	21,580	12,597	11,562	25,915	15,128	13,884	171.3	186.6
Bulgaria . .	205	190	178	107.8	115.0	57,744	50,858	30,263	69,345	61,076	36,344	113.5	190.4
Spain (1) . .	3,242	3,433	3,405	91.6	95.2	300,488	549,884	504,209	440,119	660,361	605,510	66.6	72.7
France (1) . .	3,465	3,559	3,471	97.4	99.8	924,141	1,883,678	1,228,099	1,109,810	1,661,672	1,474,837	66.8	75.2
						(2)	(2)	(2)	(2)	(2)	(2)		
Greece . .	363	361	284	100.5	127.9	26,112	47,355	55,880	31,358	56,870	67,107	55.1	46.7
Italy . . (s)	2,057	2,061	2,100	99.8	97.9	708,923	902,744	922,268	950,435	1,084,114	1,107,560	88.5	86.6
	(f)	8,445	8,538	8,496	98.9	99.5							
Luxemburg . .	3	3	4	100.9	83.9	715	2,437	1,176	859	2,926	1,412	29.3	60.8
*Rumania . .	671	671	655	100.0	102.5	...	111,010	145,144	...	133,313	174,305	...	...
*Switzerland . .	35	35	36	100.0	96.8	...	17,598	10,434	...	21,134	12,531	...	...
Czechosl. (3)	43	42	42	102.5	...	0,482	4,928	5,030	11,387	5,918	6,040	192.4	—
*Palestine . .	—	—	—	—	—	930	536	497	1,116	644	507	173.4	187.1
*Syria and Lebanon. .	126	114	138	110.1	91.2	—	—	—	—	—	—	—	—
Algeria (1) . .	601	560	511	107.5	117.8	292,567	282,282	220,417	351,347	338,995	264,701	103.6	132.7
Fr. Morocco . .	18	18	14	96.8	129.3	2,750	2,860	2,868	3,302	3,434	3,445	96.2	95.9
Tunis . . .	98	76	70	120.5	139.9	21,098	23,730	17,843	26,417	28,497	21,428	92.7	123.3
Totals. .	18,621	18,926	18,659	98.4	99.5	2,522,500	3,263,353	2,999,615	3,023,294	3,918,991	3,682,268	77.3	84.1

* Countries not included in the totals. — s) Unmixed crop. — f) Mixed crop. — (1) Area bearing. — (2) On basis of declarations made by the growers. — (3) The figure for the average is not exactly comparable with those of the years 1930 and 1929 owing to changes in the method of making estimates

very markedly in the West and Centre, districts where viticulture shows a backward tendency.

Calculating the total crop taking account of quantities not declared it is noticeable that in the years 1926, 1927 and 1928 the quantity of wine not declared varied from 40,000,000 to 43,600,000 Imperial gallons (48,100,000 to 52,300,000 American gallons) and that in the years of average crop its proportion to declared production is 4.3 % to 4.4 %. Accordingly the total crop of 1930 may be placed at 968-979 million Imperial gallons (1,162-1,176 American gallons), though for 1929, calculating on similar lines, it was 1,430 million Imperial gallons (1,717 million American gallons) and the mean of 1924-1928, calculating directly, was 1,298 million (1,559 million).

As regards the situation in the vineyards, work has been carried out under fairly good conditions in the Mediterranean region but has been hindered by bad weather everywhere else.

Italy: Seasonal operations proceeded regularly in December.

Syria and Lebanon: The general condition of the vineyards is good save in the south-east of the government of Latakia, where an invasion of locusts in August, 1930 caused losses amounting in some vineyards to 50 %, crop condition in this territory is in consequence only 85 while it is 100 in the two others.

Total production of grapes (vintage, table, and dried) is placed at 3,572,000 centals, against 3,307,000 in 1928 and 3,168,000 on the average of the three years 1923-25; percentages 108.0 and 112.8.

Tripoli: The extremely dry season has made production very poor and difficult to evaluate.

OLIVES

Italy : Harvesting was still in progress in the first half of December.

United States : The production of olives is estimated at 400,000 centals (20,000 short tons) compared with 420,000 (21,000) in 1929 and 312,000 (15,600), the average for 1924-28; percentages: 95.2 and 128.4.

Palestine : The harvest is ended.

Syria and Lebanon : Crop condition continues good in the Syrian State, the chief producer, where it was 100 on 1 December 1930, as on 1 November 1930 and on 1 December 1929. It is on the contrary, bad in the two other States, but, though in the government of Latakia it remained at 35, as on 1 November (108 on 1 December 1929), there seems to have been a slight improvement in the Lebanese State, where crop condition was 50, instead of 40 as on 1 November, thus regaining the condition of September-October (100 on 1 December, 1929).

Olives and Olive Oil Production.

COUNTRIES	AREA				ENGLISH MEASURES				AMERICAN MEASURES				% 1930/31	
	1930/31	1929/30	Average 1924/25 to 1928/29	% 1930/31	1930/31	1929/30	Average 1924/25 to 1928/29	1930/31	1929/30	Average 1924/25 to 1928/29	1929/1930	Aver. 1930 = 100		
	Thousand acres				Thousand centals				Thous. (s) pounds and (t) American gallons				%	%
Spain (1)	4,122	4,416	4,164	93.3	90.0	s) 14,093	69,598	41,408	1,409,294	6,850,777	4,140,800	21.9	36.2	36.2
Greece	—	—	—	—	—	t) 2,791	13,674	7,716	36,681	179,689	101,300	20.4	—	—
Italy	a) 1,409	1,427	1,422	98.8	90.1	s) 18,947	37,059	26,050	1,804,723	3,795,888	2,604,951	49.0	72.7	72.7
— b) —	4,250	4,237	4,252	100.3	90.9	t) —	6,416	3,076	—	84,702	52,244	—	—	—
Syria	127	127	109	100.0	117.3	s) —	497	672	—	49,747	67,155	—	—	—
Alaouite and Leb- anon.	—	—	—	—	—	t) —	142	107	—	1,869	1,409	—	—	—
—	59	58	50	101.7	117.1	s) 617	1,380	678	61,730	138,802	67,768	44.4	92.0	92.0
—	—	—	—	—	—	t) 88	131	117	1,159	3,042	1,538	38.0	75.4	75.4
Algeria	—	—	—	—	—	s) 2,064	3,792	3,470	206,353	379,196	346,966	54.4	59.5	59.5
—	—	—	—	—	—	t) 206	505	473	3,494	6,634	6,231	52.7	56.1	56.1
French Morocco.	—	—	—	—	—	s) 1,102	—	1,241	110,231	—	124,121	—	88.8	88.8
—	—	—	—	—	—	t) 198	—	164	2,607	—	2,160	—	120.7	120.7
Tunis.	—	—	—	—	—	s) 1,984	7,165	3,406	198,417	716,505	346,568	27.7	57.3	57.3
—	—	—	—	—	—	t) 397	1,433	683	5,215	18,831	8,981	27.7	58.1	58.1

a) Pure crop. — b) Mixed crop. — s) Olives. — t) Oil. — (1) Area bearing. — (2) Excluding the data for some districts.

Algeria : The bad conditions of the preceding month became still worse in the department of Algiers, where the storm of 17 and 18 December caused falling of the fruit, which was swept away by the water. Thus the estimate of olive production has been reduced by 40 % below that of the last month and that of oil by 18 % ; the two figures given this month would give a yield of oil nearer normal than last month, namely, 12.9 %, whereas last month it appeared to be scarcely 9.2 % ; that of 1929-30 was 13.3 % and the average for the period 1924-25 to 1928-29 was 13.6 %. This year appears, therefore, to be absolutely disastrous not only from the point of view of the quantity of olives harvested but also from that of yield of oil ; production is below that of the worst year of the post-war period, 1926-27, which gave a yield of 2,090,000 centals of olives and 317,000 centals (4,172,000 American gallons) of oil. It should be noted that the plantations are constantly extending and that since 1926-27 the area in production has risen by 20,000 acres, 25 % in the single department of Algiers and Oran.

Tripoli : Due to persistent drought production is very poor.

COTTON

Italy : In some areas preparation for sowings has been begun.

India : In the Central Provinces December weather was clear and cool. Dry conditions continued in the Punjab and according to a telegram received from the Punjab Department of Agriculture at the middle of January cotton picking was nearly finished while prospects were generally below normal to normal.

Little change in conditions is reported from Madras.

Towards the end of December it was reported that weather conditions had not been altogether favourable to the Indian cotton crop and conditions and prospects were on the whole fair.

Syria and Lebanon : Although in the government of Latakia general conditions are normal, in the Syrian State crops have suffered from drought and locusts.

Cotton.

COUNTRIES	AREA					PRODUCTION							
	1930/31	1929/30	Aver. 1924/25 to 1928/29	% 1930/31 1929/ 1930	Aver.	1930/31	1929/30	Aver. 1924/25 to 1928/29	1930/31	1929/30	Aver. 1924/25 to 1928/29	% 1930/31 1929/ 1930	Aver.
	1,000 acres					1,000 centals		1,000 bales of 478 lbs.					
	= 100					= 100		= 100					
Bulgaria	14	14	9	98.4	147.8	21	20	12	4	4	2	107.1	182.1
Spain	47	24	10	193.6	449.0	44	16	11	9	3	2	280.3	401.4
Greece	27	35	38	76.8	71.7	42	57	71	9	12	15	73.6	59.7
U. S. S. R. . . .	3,768	2,560	1,094	147.2	222.5	(1) 9,811	6,257	4,289	(1) 2,052	1,300	897	156.8	228.7
United States (2)	45,218	45,703	43,907	98.7	102.8	68,082	70,878	71,836	14,243	14,828	15,028	96.1	94.8
Mexico	303	402	443	80.0	88.8	800	1,176	1,161	169	246	243	68.8	60.7
*Korea	463	456	488	101.4	94.0	...	667	642	...	130	134	...	...
*India	22,964	23,536	24,036	97.6	93.2	19,012	18,088	22,724	3,977	3,910	4,754	101.7	83.7
Alauits	22	17	3	128.6	804.3	44	14	3	9	3	1	307.7	1,384.1
*Syria	51	43	58	119.1	88.6	...	54	40	...	11	8	...	...
Algeria	15	14	13	107.9	112.7	33	37	23	7	8	5	80.6	145.6
*Egypt	2,162	1,912	1,817	113.1	119.0	8,112	8,250	7,339	1,697	1,726	1,535	98.3	110.5
*Tanganyika . . .	—	—	—	—	—	88	112	91	18	23	19	78.5	96.7
Totals	74,630	74,397	72,660	100.3	102.7	106,010	105,392	107,469	22,176	22,049	22,482	100.6	98.6

* Countries not included in the totals. — (1) Provisional data. — (2) The area for 1930 is that which it is anticipated will be harvested; for previous years the figures refer to areas harvested. — (3) Figures from the end report referring to about 90% of the total area.

Algeria : Since December 15 rain hindered late picking which was protracted until January 15. In the Perrégaux area of the department of Oran, yields are below the average as a result of damage caused by a disease which has not yet been identified.

Egypt. (Telegram of 17 January) : Cotton ginned to the end of December is estimated at 964,000 bales (4,606,000 centals), of which 224,000 (1,071,000) are Sakellaridis and 740,000 (3,535,000) other varieties. There have also been obtained 23,000 bales (108,000 centals) of "linters" of all varieties.

Nigeria : Crop condition is good, normal yields or over being expected. The Department of Agriculture estimates the cotton to be purchased for export in 1930-31 at 21,000-25,000 bales (100,000-120,000 centals) of Improved Ishan, unginned cotton being expressed in terms of ginned. The estimate for ordinary native cotton is not available, but it is known that the amount of seed distributed to growers fell from 263 to 53 bales

(5,264 to 1,053 cents) for the present season. Assuming, then, that the amount bought is approximately proportional to that sown and given the fact that the amount bought last season was 2,940 bales (14,040 cents) it may be calculated that there will be an increase of about 600 bales (2,800 cents) this season (still expressing unginned cotton in terms of ginned). The total of the three kinds of cotton in round figures is 28,000 to 32,000 bales against 36,800 last season and 28,000 the mean of the preceding quinquennium.

Uganda : In the Eastern Province November was prevalently dry and late-sown cotton has suffered, shedding of the bolls being reported in many areas ; on the other hand, early sown cotton has maintained good condition. In Buganda Province crop condition was good save for some local shedding of bolls due to drought. In the Southern Province and in the Western Province weather has been favourable and, except for some slight damage by hail in the Joro district, the crop was promising. In many districts harvesting of cotton sown in May-July has already commenced.

The area sown up to the end of October was, according to a first estimate, 724,700 acres against 684,000 at the same date in 1929, an increase of 6.0 %.

Anglo-Egyptian Sudan : According to a second estimate the area this season is 395,480 acres against 369,310 in 1929-30, an increase of 7.1 %. Production is estimated at 155,700 bales (744,200 cents) against 139,200 (665,400) last season, an increase of 11.8 %.

FLAX

Now that the first estimate of production in Argentina has been published, data are possessed with reference to the 1930 crop (1930-31 for the southern hemisphere) for a group of countries furnishing together on the average about $\frac{4}{5}$ of the total world production.

The total of the data known already indicates an abundant production exceeding not only the decidedly unfavourable crop of last season by 51.4 % but also the average of the preceding five years by 6.5 %.

Taking into account also the information available for the countries for which precise estimates are still lacking (U. S. S. R., Poland, France, the Netherlands, Uruguay and a few others of minor importance), it may be calculated that world production amounts to about 92.6 million cents (165.3 million bushels) compared with 67.9 (121.3) in the previous year and 84.0 (150.0), the five year average of 1924-28.

The maxima reached in 1925 and 1927 barely exceeded 88.2 million cents (157.5 million bushels) so that this year's crop will probably be the largest yet recorded.

This result is primarily due to Argentina, where the areas sown to flax have shown a slight increase and owing to the favourable conditions this year nearly all the areas sown could be harvested giving fairly good yields. The percentage of areas abandoned, which last year reached 26 % and on the average for the preceding five years was 8 %, this year was limited to 3.5 % ; the average yield of the areas harvested is estimated, on the basis of the first estimate of production, at 6.5 cents (11.6 bushels) per acre against 5.4 (9.6) last year.

But production has been larger than last year also in Canada, the United States and India ; in Canada and the United States this is the consequence of an increase both in area and in yield per acre and in India more favourable climatic conditions compensated a new although slight reduction in cultivation. The latter is the only country of large production of flaxseed where the tendency to reduce the area sown has been continued during the last season, whereas in North America, where the area was also diminished by 4,747,000 acres in 1924 and 3,054,000 in 1928, a new increase to 4,527,000 acres was made in 1930. Moreover, flax cultivation has developed considerably in recent years not only in Argentina but also in the U. S. S. R.

Flax.

COUNTRIES	(†) AREA					(†) PRODUCTION							
	1930	1929	Aver. 1924 to 1928	% 1930 1930/31		1930	1929	Aver. 1924 to 1928	1930	1929	Aver. 1924 to 1928	% 1930 1930/31	
	—	—	—	—	—	—	—	—	—	—	—	—	—
	1930/ 1931	1929/ 1930	1924/ 1925 to 1928/ 1929	1929/ 1930 = 100	Aver. 1929/ 1930 = 100	1930/31	1929/30	1924/25 to 1928/29	1930/31	1929/30	1924/25 to 1928/29	1929/ 1930 = 100	Aver. 1929/ 1930 = 100
	1,000 acres					1,000 centals			1,000 pounds				

Fibre.

*Germany	27	33	61	84.3	44.9	—	—	—	—	—	—	—	—
Austria	11	12 (1)	10	91.5	104.3	(2) 133	(2) 156	1) 2) 150	(2) 13,204	(2) 15,605	1) 15,034	85.2	88.4
Belgium	56	68	55	82.4	101.6	251	412	568	25,100	41,216	56,783	60.9	44.2
Bulgaria	1	1	1	122.7	135.0	3	1	2	262	130	159	201.9	104.5
Spain	2	1 (3)	3	152.5	65.8	(2) 8	(2) 6	2) 3) 15	(2) 840	(2) 617	2) 1,530	136.2	54.9
Estonia	80	79	89	101.9	90.7	237	216	217	23,731	21,498	21,651	110.4	100.9
*Irish Free State	4	6	8	62.8	47.2	...	26	28	2,645	2,771	...	...	...
Finland (4)	14	12	13	110.0	101.5	35	35	34	3,527	3,527	3,363	100.0	104.6
*France	74	86	64	85.9	116.1	...	563	482	...	56,304	48,182	...	...
*Northern Ireland	28	34	35	83.5	81.0	...	155	128	...	15,487	12,785	...	...
Italy	13	16	18	77.1	68.7	56	73	51	5,553	7,295	5,088	70.1	109.2
Latvia (4)	127	138	165	91.8	76.6	428	483	506	42,836	48,347	50,587	88.6	84.7
Lithuania (4)	204	213	199	96.2	102.6	683	749	796	68,255	74,913	79,586	91.1	85.8
Netherlands	37	47	34	78.7	110.5	192	340	226	19,180	34,000	22,644	56.4	84.7
*Poland	285	280	271	98.4	105.0	...	1,148	1,110	...	144,849	110,994	...	...
*Rumania	44	43	52	101.7	83.7	...	60	71	...	5,091	7,121	...	...
Czechoslovakia (5)	44	47	53	94.9	—	132	207	248	16,202	20,728	24,752	78.2	—
*U. S. S. R.	5,436	4,945	6,404	109.9	132.8	...	7,716	6,716	...	771,620	6,716,801	...	...
Totals	589	634	640	92.6	92.2	2,188	2,677	2,813	218,786	267,876	281,177	81.6	77.8

Linseed.

Thousand bushels
of 56 pounds.

Austria	7	7	8	97.0	83.0	24	24	30	42	44	53	96.4	79.1
Belgium	56	68	55	82.4	101.6	137	396	259	245	708	463	34.6	53.0
Bulgaria	1	1	1	122.7	135.0	4	2	2	7	4	3	152.0	210.6
Spain	2	1 (3)	3	152.5	65.8	5	4	(3) 15	10	7	(3) 27	135.8	35.8
Estonia	80	79	89	101.9	90.7	205	235	235	473	420	420	112.6	112.7
Italy	24	28	40	83.9	48.7	125	149	224	223	265	400	81.2	55.0
Latvia (4)	127	138	165	91.8	76.6	423	506	461	755	904	823	83.5	91.7
Lithuania (4)	204	213	199	96.2	102.6	809	962	780	1,006	1,718	1,393	91.1	85.8
Rumania	44	43	52	101.7	83.7	218	156	143	389	278	256	140.1	152.2
Czechoslovakia (5)	44	47	53	94.9	—	155	172	193	277	308	344	90.0	—
*U.S.S.R.	5,436	4,945	6,404	109.9	132.8	...	14,756	11,685	...	26,349	20,866	...	...
Canada	580	382	742	151.7	78.1	2,407	1,154	3,408	4,459	2,080	6,085	216.4	73.3
United States	3,946	3,050	2,993	129.4	131.8	13,262	9,547	13,337	23,082	17,049	23,816	138.9	90.4
India	2,801	3,109	3,529	90.1	79.4	8,378	7,213	9,386	14,960	12,880	16,760	116.1	89.3
French Morocco	39	42	49	92.1	80.0	164	224	280	293	400	500	73.2	58.5
Argentina	7,292	5,231	6,292	138.8	117.1	47,209	28,003	40,548	84,409	50,005	72,407	168.8	116.6
*Uruguay	402	291	175	138.2	229.9	...	1,801	1,007	...	3,216	1,905	...	...
Totals	15,217	12,439	14,189	122.4	107.3	73,825	48,747	69,361	131,830	87,950	123,750	151.4	106.5

(†) The two dates mentioned refer to the years in which the harvest took place in the northern and southern hemispheres respectively. — * Countries not included in the totals. — (1) Average 1927 and 1928. — (2) Production expressed in dried flax straw. — (3) Average 1925 to 1927. — (4) Flax and Hemp. — (5) The figure for the average is not exactly comparable with those for the years 1930 and 1929 owing to changes in the method of making estimates. — (6) Average 1925 to 1928.

For all producing countries together it may be calculated that the area of flaxseed harvested in 1930 has exceeded the average for the period 1924-28 by about 2.5 million acres, and represents a new record.

With respect to supplies on the world market, some indication may be obtained from the following table in which, side by side with the data of total production, are given — because Argentina furnishes on the average about $\frac{4}{5}$ of the quantities of flax seed entering into international trade — the data of production and exports of this country.

Flaxseed.

Year of production	World production		Production of Argentina		Exports from Argentina (1)	
	(ooo centals)	(ooo bushels)	(ooo centals)	(ooo bushels)	(ooo centals)	(ooo bushels)
1924 (1924-25)	73,743	131,684	25,247	45,085	21,180	37,821
1925 (1925-26)	88,578	158,175	42,064	75,115	36,883	65,864
1926 (1926-27)	86,355	154,206	45,239	80,784	41,809	74,658
1927 (1927-28)	88,317	157,710	46,297	82,674	42,867	76,548
1928 (1928-29)	82,969	148,159	43,892	78,379	35,660	63,679
1929 (1929-30)	67,823	121,113	28,003	50,006	(3) 23,989	(3) 42,837
1930 (1930-31)	(2) 92,594	(2) 165,348	47,267	84,406	...	...

According to official information on December 19 there were still in existence in Argentina, in addition to the new crop, 4,107,000 centals (7,334,000 bushels) of flaxseed from the previous production, so that taking into account the total supplies and requirements of this country (3,968,000 centals or 7,086,000 bushels for seed and 661,000 centals or 1,181,000 bushels for home consumption), the quantities exportable in the present year may be estimated at about 46.3 million centals (82.7 million bushels).

The forecasts of a heavy world production and of large supplies for export from Argentina have contributed to accelerate the movement towards a fall of linseed prices, which, after remaining at a still rather high level in the first half of 1930 due to the poor crop of 1929, have since fallen heavily month by month.

Prices of La Plata linseed at Hull.

(Prices c.i.f. embarkment during the current month and following month, in pounds sterling per long ton).

Annual average 1913	11-11-5	Monthly average July	1930 15- 2-10
Monthly average January 1930	18- 1-9	»	» August 15-11- 9
» February »	17- 5-4	»	» September 14- 0- 4
» March »	16- 0-0	»	» October 12- 3- 0
» April »	18- 0-0	»	» November 10- 6-10
» May »	17- 9-0	»	» December 9- 7- 2
» June »	16-16-7	Price on January 16, 1931 8- 7- 6	

On the basis of quotations at the middle of January, prices are lower by over one half compared with those quoted a year ago and also lower by over one-quarter compared with those of 1913.

* * *

Great Britain and Northern Ireland : Owing to the very low prices very little scutching was carried out in December. Total output is expected to be average, and quality of the fibre on the whole fairly good.

(1) Exports in the calendar years indicated in the first column. — (2) Figure partly estimated.
— (3) Exports for the period ending December 18, 1930.

India : No rain fell during December in Bihar and Orissa but light to moderate rain was recorded at the beginning of January ; the condition of flax is generally good. Weather in the Central Provinces was clear and cool, condition of the crop remaining good.

OTHER PRODUCTS

Tea.

India : In North India the weather continued seasonable during November although it inclined to be cold and the crop was closing ; the crop until the end of November showed a decrease of over 44 $\frac{1}{4}$ million lbs. as compared with the same date of last year.

In South India weather conditions were still disappointing in November and the crop did not come up to anticipations ; outturn to the end of November was 7.3 % behind that to the same date of last year.

Coffee.

Nicaragua : According to a communiqué of the Nicaraguan Government production has not suffered from the rains, flowering having occurred previously. Expert estimates place the output at a level much above that of last year and the quality better.

Indo-China : In Annam, despite the attacks of *Corticium salmonicolor* and some anthracnosis the crop has on the whole been good. In Tonkin borers have caused great damage to arabica in certain localities.

Cacao.

Gold Coast : Harvesting continued throughout December and at the end of the month few pods were left on the trees. Weather was favourable ; the dry spell in the latter half of the month facilitated harvesting and enabled a considerable amount of stored beans to be sun-dried. Quality is unchanged ; the percentage of germinated beans is high.

In the southern area growers adhered to the resolution to store beans for a rise in price, but in Ashanti the attempt to bring about the adoption of a similar policy had little effect and marketing was normal, with free movement of the crop except in a few localities. Shipments by steamer in October-December were 40,000 l. tons against 81,000, the average for the last four years ; tonnage arriving by rail at Accra and Takoradi was 3,400 and 26,400 respectively against the four year averages of 37,000 and 39,000.

Groundnuts.

United States : Figures for the area and production of groundnuts in 1930 are as follows. The total production includes groundnuts gathered and also those grazed or otherwise utilised :—

	1930	1929	Average 1924-28	1929 = 100	% 1930 = 100
	Area (in 000 acres).				
Groundnuts (total)	1,827	2,021	1,685	90.4	108.4
Groundnuts (gathered)	1,108	1,325	1,068	83.6	103.7
	Production (in 000 centials).				
Groundnuts (total)	11,830	13,586	11,272	87.1	105.0
Groundnuts (gathered)	7,407	9,290	7,590	79.7	97.6

The acreage planted for 1930 was reduced by 10 % compared with that of the previous year due to low prices. Yield per acre was also reduced by unfavourable weather. The reduction is general for all varieties of groundnuts.

Rapeseed, Sesamum and Sunflower.

Germany : The definitive data of area and production of colza are as follows. Area 32,000 acres in 1930 against 38,900 in 1929 and 55,000, the average of 1927 and 1928 (82.5 % and 58.3 %). The corresponding data for production are : 767,000 bushels (384,000 centals), 950,000 (475,000), and 1,353,000 (677,000), the percentages being 80.8 and 56.7.

Austria : Owing to alternate frost and thaw colza has to some extent suffered. On 1 January its crop condition was 2.6 against 2.4 on 1 December and 2.3 on 1 January 1930.

Rumania : The area sown to winter colza up to 1 December 1930 was 66,000 acres against 42,000 at the same date in 1929 (157.0 %).

U. S. S. R. : The area cultivated under sunflower in 1930 was 8,557,000 acres against 8,713,000 in 1929 and 7,638,000, the average for the four years 1925-28 ; percentages : 98.2 and 112.0. Production in 1930 is estimated at 46,738,000 centals against 38,801,000 in the preceding year and 44,813,000, the four year average ; percentages : 120.5 and 104.3.

India : No rain fell during December in Bihar and Orissa but light to moderate rains were recorded at the beginning of January ; condition of rapeseed and mustard crops remains good. Weather has been dry in Bengal and crop prospects are satisfactory. In the Punjab rain was badly needed at the beginning of January after a month of dry weather. The condition of irrigated crops was average to good and that of unirrigated crops below the average to average.

According to the final report the area under sesamum in 1930-31 was 5,294,000 acres against 5,011,000 in 1929-30 and 5,243,000, the average for the preceding five seasons ; percentages 105.6 and 101.0. Production was 10,438,000 centals (522,000 short tons) compared with 8,736,000 (437,000) in 1929-30 and the average of 9,901,000 (495,000) ; percentages ; 119.5 and 105.4.

Syria and Lebanon : The total production of sesamum of the mandated territories is estimated at only 35,400 centals (1,800 short tons) for 1931, though it reached 76,500 (3,800) in 1929, this year's production being only 46.3 % of the latter.

Tobacco.

Italy : Preparatory work is almost finished.

United States : In the following table are given the December estimates of area and production in 1930 of the main types of tobacco grown in the United States compared with the figures for 1928 and 1929 :—

Classification	Area (ooo acres)			% 1930	Production (ooo lbs)			% 1930
	1930	1929	1928	1929==100	1930	1929	1928	1929==100
Flue-cured . . .	1,157	1,135	1,140	102.0	790,950	750,899	740,807	105.3
Fire-cured . . .	233	223	184	104.6	158,559	183,087	132,179	86.6
Air-cured, light.	488	462	367	105.6	323,756	359,316	291,073	90.1
Air-cured, dark	77	74	60	103.6	59,185	60,884	43,968	97.2
Cigar filler . . .	71	69	66	103.3	72,365	72,108	70,513	100.4
Cigar binder . .	71	61	64	115.4	92,919	80,904	82,796	114.9
Cigar wrapper .	11	13	12	84.4	11,530	15,159	11,806	76.1
Miscellaneous .	2	3	2	60.0	1,044	2,320	1,405	45.1
Total . . .	2,110	2,040	1,894	108.4	1,510,808	1,524,677	1,374,547	99.1

The increase in production of flue-cured tobacco was general throughout the area producing this type of tobacco, except in the Old Belt, where a reduction took place in both area and production. Despite the increase in the area under fire-cured tobacco, there was a reduction in production due to drought, the effects of which were especially severe in areas producing this type in Virginia, Kentucky and Tennessee; damage to quality was general, but greatest in Virginia. There was also a smaller crop (by 9 %) of Burley (air-cured, light) from an area 6 % larger than that of 1929.

Of a total increase in production of cigar types, the outstanding features are a decrease of 11 ½ million lbs in the production of Pennsylvania Seedleaf (filler) offset by a corresponding increase of Dutch (filler) in the Miami valley of Ohio, increases of Connecticut Valley Broadleaf and Northern Wisconsin (binders) and decreases of Shade Grown wrappers.

Tobacco.

COUNTRIES	AREA					PRODUCTION				
	1930	1929	Average 1924 to 1928	% 1930		1930	1929	Average 1924 to 1928	% 1930	
				1929	Aver.				1929	Aver.
	1,000 acres					1,000 pounds				
Belgium	7	7	7	98.0	98.0	12,928	15,085	15,333	86.0	84.3
Bulgaria	78	94	88	83.2	88.3	52,826	72,062	67,817	73.1	77.9
Spain	16	7 (1)	7	244.3	221.9	16,535	10,378 (1)	11,400	159.3	145.0
Greece	203	240	212	84.5	95.9	155,253	180,125	129,834	97.0	119.6
Italy	104	95	95	109.6	109.4	108,774	97,048	90,514	112.1	120.2
*Rumania	85	76	78	112.6	109.7	...	57,316	40,439	...	...
Czechoslovakia (2) .	19	19	13	117.6	—	19,842	20,207	14,845	98.2	—
U. S. S. R.	262	200 (3)	217	130.9	120.5	306,833	264,556 (3)	373,718	150.0	106.2
Canada	41	38	34	107.0	120.8	36,713	29,786	32,539	123.3	112.8
United States (4) . .	2,110	2,040	1,720	103.4	122.7	1,510,308	1,524,677	1,302,461	99.1	116.0
Japan	89	88	92	100.8	96.8	145,175	138,065	143,992	105.1	100.8
Syria and Lebanon .	9	9	7	98.9	128.8	7,004	6,614	4,952	105.9	141.5
Algeria	42	53	66	78.9	64.2	36,509	44,561	53,037	81.9	68.8
*Tunis	1	1	1	141.2	135.1	...	925	114	...	...
Totals . . .	2,960	2,987	2,358	103.2	116.4	2,496,760	2,383,114	2,240,442	104.9	111.5

* Countries not included in the totals. — (1) Year 1928. — (2) The figures for the average are not exactly comparable with those for the years 1930 and 1929 owing to changes in the method of making estimates. — (3) Average 1925 to 1928. — (4) The area for 1930 is that which it is anticipated will be harvested; for previous years the figures refer to the areas harvested.

Porto-Rico: The tobacco crop is anticipated to result somewhat below normal in quantity and quality due to the previous drought, which interfered with tobacco seedlings, and to the heavy rains which fell at the middle of December.

Hemp.

Italy: Preparatory work is proceeding.

Hemp.

COUNTRIES	AREA					PRODUCTION				
	1930	1929	Average 1924 to 1928	% 1930		1930	1929	Average 1924 to 1928	% 1930	
				1929 = 100	Aver- age = 100				1929 = 100	Aver- age = 100
1,000 acres				1,000 pounds						
<i>Fibre.</i>										
*Germany (1)	1	1	5	94.7	22.9	—	—	—	—	—
Austria	1	1	(2)	79.8	86.7	(3)	902	(3)	1,823	54.4
Bulgaria	9	8	9	106.6	91.5	3,584	2,870	2,987	124.6	120.0
Spain	15	14	16	104.1	97.0	12,806	14,639	17,731	88.1	72.7
*France	10	11	12	80.0	83.3	...	10,921	10,521	...	...
Italy	214	224	225	95.3	94.8	201,400	197,777	215,106	101.8	93.6
*Poland	78	83	72	93.2	108.0	...	49,434	38,859	...	...
*Rumania	83	91	99	90.8	84.0	...	42,658	84,285	...	...
Czechoslovakia (4) .	25	26	27	98.5	—	11,433	13,627	16,908	83.9	—
*U. S. S. R.	1,853	2,155	(5)	2,364	89.0	77.7	...	690,711	(5)	719,922
Syria	6	7	6	83.6	110.0	0,856	5,033	3,142	136.2	218.2
Totals	270	280	284	95.6	94.7	237,161	235,775	257,707	100.6	92.0

Fibre.

Hempseed.

Austria	(6)	(6)	1	82.4	54.0	132	200	310	66.2	42.6
Bulgaria	9	8	10	106.6	91.5	3,960	2,213	2,586	178.9	153.1
Spain	15	14	16	140.1	97.0	4,425	4,706	5,520	94.0	80.2
Czechoslovakia (4) .	25	26	27	98.5	—	10,721	10,903	11,777	96.3	—
*U. S. S. R.	1,853	2,155	(5)	2,364	86.0	77.7	—	1,278,685	(5)	1,238,782
Totals	49	48	54	105.3	95.2	19,238	18,022	20,193	106.6	96.7

* Countries not included in the totals. — (1) Hemp and other textile plants. — (2) Average 1927 and 1928. — (3) Production in terms of dried hemp straw. — (4) The figure for the average is not exactly comparable with those of the years 1930 and 1929 owing to changes in the method of making the estimates. — (5) Average 1925 to 1928. — (6) Area under 500 acres.

Hops.

COUNTRIES	AREA					PRODUCTION				
	1930	1929	Average 1924 to 1928	% 1930		1930	1929	Average 1924 to 1928	% 1930	
				1929 = 100	Aver- age = 100				1929 = 100	Aver- age = 100
1,000 acres					1,000 pounds					
Germany	32	38	34	85.9	94.7	24,366	30,074	12,580	81.0	198.7
Belgium	3	3	3	80.7	74.1	2,271	4,370	5,389	52.0	42.5
England and Wales .	20	24	25	83.4	80.3	28,336	40,219	36,467	70.5	77.7
Czechoslovakia (1) .	39	43	31	91.1	—	25,097	26,053	20,703	96.3	—
—										
United States . . .	19	25	22	78.3	86.8	23,447	33,220	30,273	70.6	77.5
Totals	113	133	115	86.8	97.9	103,517	133,936	105,362	77.4	98.5

(1) The figure for the average is not exactly comparable with those for the years 1930 and 1929 owing to changes in the method of making estimates.

Sericulture.

The results of the last season are now known for six countries which in 1929 had a total production of cocoons equivalent to 98.7 % of world production (excluding China and Persia). The production of cocoons amounted to a total of 1,014,370,000 lbs. which shows an increase of 0.1 % compared with 1929 and of 17.7 % over the average for 1924-28.

Consequently, for the six countries named below, production in 1930 equalled that of 1929 due to the fact that the slight diminution in the production of cocoons in Japan and Italy and the larger reduction in France were offset by the more abundant yields obtained in Bulgaria, Korea, Syria and Lebanon.

For these six countries together however, the quantity of silk-worm eggs placed in incubation in 1930 was 3.6 % less than in 1929 but 2.1 % above the average for 1924-28.

Sericulture.

COUNTRIES	QUANTITIES OF EGGS PREPARED FOR INCUBATION					PRODUCTION OF COCOONS				
	1930	1929	Average 1924 to 1928	% 1930		1930	1929	Average 1924 to 1928	% 1930	
				1929	Aver.				1929	Aver.
	1,000 ounces			= 100	= 100	1,000 pounds			= 100	= 100
Bulgaria	53	44	43	118.9	124.2	5,512	5,244	4,057	105.1	135.8
France	39	51	67	76.5	58.2	3,977	5,545	7,114	71.7	55.9
Italy	946	973	1,000	97.2	94.6	116,259	117,614	110,900	98.8	104.8
Korea	332	308	249	107.7	133.4	38,304	34,068	22,310	112.7	172.1
Japan (s)	2,800	2,678	2,524	104.6	110.9	463,665	418,283	367,652	110.8	126.1
Japan (d)	3,270	3,062	3,421	89.3	95.6	378,626	425,760	343,433	88.9	110.2
Syria and Lebanon.	114	121	92	94.1	124.1	7,937	7,200	6,392	110.1	124.2
Total . . .	7,534	7,837	7,396	96.4	102.1	1,014,370	1,013,723	861,858	100.1	117.7

s) Spring cocoons. — d) Summer-autumn cocoons.

It should be recollected that world production of cocoons has more than doubled during the last twenty years : from 485,989,000 lbs. on the average for the period 1909-13, to 1,027,199,000 in 1929.

Rapidly reviewing the most important silk markets, namely those of Italy and Japan, a continued fall of prices is noted throughout 1930, placing this industry also in a difficult position.

In Italy, prices had fallen considerably already in 1929 ; in fact raw silk extra 13/15 which was quoted at 220 lire per kilogram in January 1929, fell to 185 in December ; opening at 180 in January 1930, it was reduced to nearly 105 liras by December 1930, representing a loss in two years of over 50 % in value. Japanese silk on the Yokohama market also did not resist the general crisis in the past year ; in fact, the quality Large Double Extra, which was quoted at 1335 Yens per picul in January 1930, was sold at 720 Yens in the following December, despite the steps taken by public authorities to support the weakening market.

Among the most important of the factors causing the fall should be remembered the instability of the American market, which generally consumes large quantities of foreign silk, giving rise to a very considerable reduction in the volume of imports.

In the New Year, judging from the course of transactions and the general attitude on the markets, the situation seems to show greater firmness, giving the impression that the silk market is progressing, if only slowly, towards improvement.

* * *

Brazil : In the State of San Paolo, the largest producer of cocoons, there were distributed for the 1930-31 season, which runs from September to May, 3,000 ounces of eggs constituting the first crop, while another 4,000 will be distributed for succeeding crops.

Indo-China : In Cambodia, the fear of floods caused a reduction in incubations during the season 1930-31 ; summer storms caused damage to silk worm eggs and some incubations have been totally lost.

FODDER CROPS

Germany : The definitive data for area and production of the principal fodder crops in 1930 are as follows :

	1930	1929	Average 1924-28	% 1930 1929 = 100	Aver. = 100
	Area (thousand acres)				
Mangolds	1,824	1,805	1,778	101.1	102.6
Clover	4,365	4,331	4,554	100.8	95.8
Lucerne	740	703	677	105.4	109.3
Irrigated and non-irrigated meadows.	13,597	13,618	13,538	99.8	100.4
	Production				
Mangolds (1000 sh. t.)	33,512	26,685	26,038	125.6	128.7
	(1000 cent.) 670,256	533,698	520,763		
Clover (1000 sh. t.)	10,665	8,940	9,737	119.3	109.5
	(1000 cent.) 213,296	178,796	194,746		
Lucerne (1000 sh. t.)	2,283	1,728	1,755	132.1	130.1
	(1000 cent.) 45,663	34,569	35,096		
Irrig. and non-irrig. meadows (hay) . (1000 sh. t.)	27,823	23,765	25,083	117.1	110.9
	(1000 cent.) 556,473	475,298	501,670		

Austria : Apart from slight damage caused by field mice in some clover fields and meadows, fodder crops present a generally good appearance. On January 1 of this year crop conditions were as follows : red clover: 2.4 (against 2.4 on December 1 and 2.5 on January 1, 1930) ; alfalfa : 2.0 (3.0, 2.7) ; mixed clover: 2.5 (2.4, 2.5) ; mixed fodder and vetches : 2.5 (2.6, 2.6) ; permanent meadows : 2.4 (2.5, 2.5) and pastures : 2.8 (2.7, 2.7).

Belgium : Fields of fodder crops appear to be in good condition.

France : Up to the beginning of January pastures, plentifully supplied with moisture, were still green, though drier weather would have been beneficial to them. The excessive rains and inundations at the beginning of the month harmed the meadows along the river banks and in the low valleys. Weather in the second week of January was favourable to the meadows.

Great Britain and Northern Ireland : The mild and generally wet weather in December was unfavourable for lifting and clamping of roots and in many areas of England and

Wales, though the harvest was practically completed by the end of the month, the roots have not been secured in clean condition.

In Northern Ireland the hay production from permanent meadows is estimated at 10,148,000 centals (507,000 short tons) an increase of 2.6 % on that of 1929 but a decrease of 19.8 % on that of the preceding quinquennium; hay from temporary meadows is estimated at 8,576,000 centals (429,000 short tons), an increase of 3.8 % on that of 1929 but a decrease of 10.8 % on that of the five-year period. The yield per unit area for the entire hay crop is the same as that of 1929.

Italy: Autumn-winter grasses are in good condition. Stocks of fodder are abundant.

Argentina: Pastures are in good condition, with abundant fodder and a good store of moisture.

United States: The December estimates of area and production of hay seeds in 1930 together with the figures for the preceding year and the five year average, are given in the following summary:

	1930	1929	Average 1924-28	Percentages 1929 = 100	Average = 100
Area (in 000 acres).					
Clover seed (red and Alsike) . . .	1,017	1,643	796	61.9	127.8
Timothy seed	356	391	606	91.0	58.7
Alfalfa seed	316	305	264	103.5	119.8
Sweet clover seed	165	207	(1) 262	79.7	63.0
Lespedeza seed	27	42	(1) 41	64.3	65.1
Production.					
Clover seed (red and (000 centals)	876	1,514	648	57.9	135.1
Alsike). (000 bushels)	1,460	2,523	1,080		
Timothy seed . . . (000 centals)	666	652	1,030	102.1	64.6
(000 bushels)	1,479	1,448	2,290		
Alfalfa seed (000 centals)	552	476	534	116.1	103.4
(000 bushels)	920	793	890		
Sweet clover seed . . (000 centals)	394	521	(1) 650	75.6	60.6
(000 bushels)	656	868	(1) 1,083		
Lespedeza seed . . . (000 centals)	24	46	(1) 55	52.2	44.0
(000 bushels)	96	185	(1) 210		

Production of red and alsike clover seed is only slightly over one-half as large as in 1929; the acreage cut for seed was much less in nearly every important producing State and yields are lower than in 1929. Sweet clover seed production is only about three-quar-

ters as large as in 1929. The increased quantity of alfalfa seed produced is due to the occurrence of favourable weather at harvest time in the central States. Drought reduced the crop of lespedeza seed.

The farm prices of all hay seeds have fallen less compared with the level of a year ago than might be expected, as a result of the greatly increased seed requirements brought about by the heavy loss of seedlings in 1930.

In the following summary are given the latest figures of area and production of tame and wild hay in 1930.

	1930	1929	Average 1924-28	Percentages 1929=100	1930 Average = 100
Area (thousand acres).					
Tame hay	58,473	60,265	59,301	97.0	98.6
Wild hay	14,136	13,938	14,125	101.4	100.1
Production (thousand centals and sh. tons).					
Tame hay (centals)	1,653,120	2,017,860	1,872,000	81.9	88.3
(sh. tons)	82,656	100,893	93,600		
Including :					
Alfalfa (centals)	571,740	594,900	574,000	96.1	99.6
(sh. tons)	28,587	29,745	28,700		
Mixed clover and timothy (centals)	386,700	531,620	478,184	72.7	80.9
(sh. tons)	19,335	26,581	23,909		
Red, crimson and alsike clover . . (centals)	160,100	275,680	194,716	58.1	82.2
(sh. tons)	8,005	13,784	9,736		
Timothy (centals)	153,380	200,560	231,656	76.5	66.2
(sh. tons)	7,660	10,028	11,583		
Sweet clover . . . (centals)	37,900	47,360	37,380	80.0	101.4
(sh. tons)	1,895	2,368	1,869		
Wild hay (centals)	242,220	255,300	270,000	94.9	89.7
(sh. tons)	12,111	12,765	13,500		

A short hay crop was produced in 1930 because of reduced acreage and low yield per acre. The reduction in acreage was brought about by the loss of new seedings due to dry weather in the late summer of 1929 and to winter injury during the winter of 1929-1930 and by ploughing up of meadows because of the large carry over of hay. The low yields per acre were the result of drought in the summer of 1930 which had particularly severe effects on the clover hay crop in the central States, while the alfalfa crop suffered least, being situated in the prairie and mountain States outside the 1930 drought area.

The average farm price of hay on December 1 was rather higher than on December 1, 1929, despite the general depression of commodity prices.

Egypt : Crop condition of bersim on 1 January was 100 as on 1 December and on 1 January, 1930.

LIVESTOCK AND DERIVATIVES

Condition of livestock and dairy production.

Germany : In the following table are given the figures for the production and distribution of cow's milk and goat's milk during the last five years :—

	1930 —	1929 —	1928 —	1927 —	1926 —
<i>Unitary yields and total production :</i>					
Average annual yield per cow :					
(Imperial gallons) . . .	488.3	488.3	488.3	461.9	418.0
(American gallons) . . .	586.5	586.5	586.5	554.8	501.9
Average annual yield per goat :					
(Imperial gallons) . . .	99.0	99.0	99.0	77.0	77.0
(American gallons) . . .	118.9	118.9	118.9	92.5	92.5
	(in thousands)				
Total production of cow's milk :					
(Imperial gallons) . . .	4,588,909	4,620,745	4,339,017	4,262,685	3,822,514
(American gallons) . . .	5,510,867	5,556,304	5,210,769	5,119,102	4,590,496
Total production of goat's milk :					
(Imperial gallons) . . .	219,975	243,513	208,757	225,035	244,085
(American gallons) . . .	264,171	292,437	250,698	270,247	293,124
Total production of cow's and goat's milk :					
(Imperial gallons) . . .	4,808,884	4,870,258	4,547,773	4,487,720	4,066,599
(American gallons) . . .	5,775,038	5,848,742	5,461,467	5,389,348	4,883,620
<i>Distribution of the total milk production :</i>					
For direct consumption (32 %)					
(Imperial gallons) . . .	1,538,729	1,558,526	...	1,436,000	1,301,309
(American gallons) . . .	1,847,875	1,871,650	...	1,724,507	1,562,755
For the manufacture of butter and cheese (55 % in 1930, 1929, 1927 and 60 % in 1926)					
(Imperial gallons) . . .	2,644,985	2,678,642	...	2,468,345	2,439,946
(American gallons) . . .	3,176,390	3,216,808	...	2,964,261	2,930,156
For feeding calves and goat-kids (13 % in 1930, 1929, 1927 and 8 % in 1926)					
(Imperial gallons) . . .	625,170	633,089	...	583,375	325,322
(American gallons) . . .	750,773	760,284	...	700,581	390,682

Belgium : Livestock are in good condition. The abundance of fodder and mild temperatures are facilitating the maintenance of farm livestock.

Irish Free State : The milder weather in most parts of the country in December made the drain on fodder less than expected. The yields of mangels and turnips though less than those of last year, were better than anticipated and the roots are sound and of good keeping quality, while there is in addition a fair reserve of hay and an ample reserve of home-grown grain. Winter requirements of livestock appear, therefore, to be adequately provided for.

Milk yields are normal for the season.

Great Britain and Northern Ireland : The outlook for winter keep is generally satisfactory. In England and Wales supplies have not been unduly depleted and in Scotland, though the turnip crop is much lighter and of generally inferior quality, supplies of dry fodder and concentrated feeding-stuffs are plentiful, while on a number of farms home-grown grain is being used more freely ; in Northern Ireland home-grown feeding-stuffs are adequate for present requirements, while purchased feeding-stuffs continue to be freely used on account of their cheapness, the number of cattle stall-fed being slightly above normal for the season.

Milk yields are generally normal.

Further details for Northern Ireland indicate that the weather recently has been more favourable for the welfare of cattle and sheep and, generally speaking, all descriptions of livestock are in very fair condition for the time of year.

Argentina : Health is generally good. Only in some departments of Entre Rios the sheep are affected by scab. The horse breeders of Cordoba are feeling the lack of demand.

United States : The number of hens and pullets of laying age in the farm flocks of crop reporters on December 1 averaged 84.5 per farm or almost the same as the 84.4 average a year ago. Hatchings were unusually early and layings per farm flock on December 1 averaged 12.6 eggs compared with 11.1 eggs in December 1929 the increase being probably partly due to the relatively greater maturity of the pullets in the laying flocks.

Mild weather at the end of December was very favourable for livestock in the Great Plains where much pasturing was possible, thus saving feed. Winter feeding had begun in some Northern Rocky Mountain sections. Severe cold was unfavourable in the Great Basin. Light to heavy rains fell over the great Lakes area and also over the Middle Atlantic States which hitherto had experienced a severe deficiency of moisture.

Algeria : The livestock situation until the middle of December was very bad ; as a result of the persistent drought there is no grass or water for the animals. Since December 16 some rainfall brought about a certain improvement in the condition of livestock but it is estimated that a considerable proportion of the sheep flocks has been lost.

French Morocco : Condition of stock is very precarious, the natives having exhausted their reserves and the grass having scarcely sprouted, and the animals are still in quite a serious state of physiological distress, though their situation has improved since the rains of December.

Tunis : Livestock are still in rather precarious condition ; despite the December rains it is estimated that sheep flocks have suffered important losses.

The number of swine in Germany on December 1, 1930.

On December 1, as part of the annual count of the different kinds of livestock, the fourth estimate for 1930 was made of the number of swine. For this kind of livestock in order to give data for following more closely the progress of raising a count has, in fact, been made quarterly since June 1929.

Comparing the results of the four estimates for 1930, it appears that the lowest number of swine was recorded on March 1; the total number then increased by 6 % from March 1 to June 1, by 18 % from June 1 to September 1, and from September 1 to December 1 it remained on the whole practically unchanged, but at the latter date the number of sucking pigs had diminished by 17 % and that of pigs over 6 months of age had increased by 12 %.

Numbers of pigs in Germany (1).

(1,000 head).

CLASSIFICATION BY SEX AND AGE	1 Dec. 1930	1 Sept. 1930	2 June 1930	1 March 1930	2 Dec. 1929	2 Sept. 1929	1 June 1929	1 Dec. 1928	1 June 1928	1 Dec. 1927	1 Dec. 1913 (1)
<i>Totals</i>	23,363	23,423	19,805	18,649	19,944	19,604	16,795	20,106	20,187	22,899	22,533
<i>Sucking pigs under 8 weeks of age . .</i>	5,440	6,522	5,091	5,012	4,417	5,373	4,160	4,003	4,936	4,379	
<i>Young pigs from 8 weeks to 6 months of age</i>	10,002	9,809	9,178	8,555	8,693	8,290	8,099	8,487	9,557	9,910	13,350
<i>Pigs from 6 months to 1 year of age</i>	5,470	5,125	3,842	3,487	4,599	4,288	3,060	5,129	4,149	5,751	6,677
Of which:											
Boars for service	67	57	57	54	56	50	48	53	52	62	—
Sows for breeding (total)	673	812	876	722	683	652	671	556	707	504	—
Number of sows served	(368)	(442)	(574)	(455)	(383)	(363)	(405)	(312)	(422)	—	—
Other swine	4,729	4,256	2,909	2,712	3,880	3,585	2,341	4,520	3,890	5,185	—
<i>Pigs, 1 year old and over</i>	2,451	1,967	1,694	1,595	2,235	1,653	1,475	2,487	1,545	2,858	2,506
Of which:											
Boars for service	62	61	57	51	50	58	55	52	60	55	—
Sows for breeding	1,496	1,467	1,356	1,229	1,179	1,208 (2)	1,145	1,063	1,150	1,218	—
Sows served	(930)	(861)	(915)	(792)	(775)	(737) (3)	(787)	—	—	—	—
Other swine	802	440	280	315	1,006	387	275	1,372	335	1,584	—

(1) Present territory, excluding the Saar. — (2) Excluding sows in farrow in the cities of Prussia having over 100,000 inhabitants. — (3) Including sows in farrow in cities of Prussia having over 100,000 inhabitants.

The seasonal movement according to which, given the absence of exceptional circumstances, the number of mature or not too young pigs for slaughter reaches its maximum at the beginning of the winter, that is, at the commencement of the period of largest slaughter is reflected in the movement from June to September and from September to December, which was perfectly parallel in 1929 and 1930.

The total number of pigs on December 31, 1930 was the highest recorded until that date.

As an index of the tendency in pig raising in the near future it is worthy of mention that the number of brood sows and that of sows in farrow on December 1, 1930, represented the maximum reached at this period of the year, for the whole of the period for which data is available.

Livestock in the U. S. S. R.

In the following table are given for a series of years figures taken from the annual statistics of livestock in the U. S. S. R. in the spring. The data, taken from the most recent sources show some differences from those published previously for the years before 1930.

Year	Horses	Cattle	Sheep	Pigs
1930	31,200,000	52,600,000	89,900,000	12,200,000
1929	34,600,000	67,200,000	132,800,000	20,500,000
1928	33,500,000	70,700,000	135,600,000	26,100,000
1927	31,000,000	68,200,000	126,800,000	23,200,000
1924	24,700,000	56,700,000	95,100,000	21,300,000
1916	35,800,000	60,600,000	113,000,000	20,900,000

For cattle, sheep and pigs, a constant increase has taken place from 1924 to 1928, while in the following year and especially in 1930, there was a large decrease, principally marked in the case of sheep and pigs. The number of horses continued to increase until 1929, but in 1930 a notable reduction occurred also in this class, although relatively smaller than for the other classes of livestock.

The cause of this sharp decrease in the numbers of livestock in the U. S. S. R. in the years 1929 and 1930 may be ascribed to the fact that, owing to the collectivisation of individual peasant holdings which reached its maximum intensity in the autumn of 1929 and the following period, the peasants slaughtered or sold for slaughter large numbers of livestock. The diminution of livestock has often been defined in declarations by political representatives of the U. S. S. R. as "the cost of collectivisation" of soviet agriculture.

A comparison of the respective data for 1930 and 1929 gives the following percentage decreases: 40 % for pigs; 32 % for sheep; 22 % for cattle and 10 % for horses. The diminution of the numbers of horses is being compensated to some extent by the diffusion of mechanical traction in agriculture, which has been particularly encouraged in recent years by the Soviet Government.

For cows, on the basis of an indication that their number in the spring of 1930 was 17 % below that anticipated in the State Plan (31,400,000 cows) it may be estimated that they numbered 26 million head in 1930 compared with the maximum figure of about 30 million head reached in 1928. It is not without interest to note in this connection that the progressive increase in the number of cows which occurred until 1928, was accompanied by a successive increase in the exports of butter from the U. S. S. R. which rose constantly from 49,547,000 pounds in the economic year (October 1-September 30) 1923-24 to 72,431,000 pounds in the economic year 1927-28, representing the period during which the number of cows was highest. In the following economic year exports fell to 61,209,000 pounds, a level practically the same as in 1925-26 and in the period October 1, 1929-September 1, 1930 (first eleven months of the economic year 1929-30) they were further reduced to 18,429,000 pounds.

Of the other causes which contributed to the diminution in the number of livestock in 1929 and in 1930 should be mentioned the rather poor production of fodder crops, particularly in 1929, and in some regions also in 1930.

To deal with the situation, the Government has taken a series of measures which, besides restricting the slaughtering of young livestock destined for the reconstruction of herds in the agricultural year in course, tend principally towards the creation of special farms for raising livestock, both State (Sovkhos) and collective composed of individual peasant holdings (Kolkhos). In Siberia and the northeastern parts of European Russia special farms for the raising of dairy cattle have been established or are in course of construction. Generally speaking, the question is one of adapting to livestock raising the principle of collectivisation, which formerly was particularly applied to the production of vegetable products.

Livestock in Canada.

The numbers of livestock in Canada in June 1930 compared with the corresponding figures for the preceding five years are as follows :

	1930	1929	1928	1927	1926	1925
	(thousands)					
<i>Horses</i>	3,295	3,377	3,376	3,422	3,398	3,554
Stallions	20	21	21	23	20	27
Mares	1,556	1,606	1,604	1,619	1,583	1,685
Geldings	1,407	1,447	1,456	1,477	1,493	1,540
Colts and fillies under 2 years	312	303	295	303	302	302
<i>Mules</i>	6	6	6	5	5	8
<i>Cattle</i>	8,937	8,825	8,793	9,172	8,571	9,307
Bulls 1 year old and over	286	265	271	270	244	282
Cows kept mainly for milk	3,683	3,685	3,792	3,894	3,839	3,830
Calves	1,935	1,990	1,911	1,816	1,840	1,933
Other cattle	3,033	2,885	2,819	3,192	2,648	3,262
<i>Sheep</i>	3,696	3,636	3,416	3,263	3,143	2,756
Sheep	2,015	1,885	1,910	1,809	1,738	1,507
Lambs	1,681	1,751	1,506	1,454	1,405	1,249
<i>Goats</i>	13	13	12	11	11	10
Goats in milking	5	5	4	4	4	3
Goats not in milking	8	8	8	7	7	7
<i>Swine</i>	4,000	4,382	4,497	4,695	4,360	4,426
Brood sows	507	537	550	577	570	533
Other live pigs	3,493	3,845	3,947	4,118	3,790	3,893
<i>Poultry</i> :	60,795	59,933	53,780	50,178	50,108	48,134
Hens, etc.	56,247	55,243	49,593	46,172	46,096	43,703
Turkeys	2,399	2,423	2,066	1,890	2,088	2,142
Geese	1,160	1,155	1,125	1,135	1,011	1,185
Ducks	989	1,112	996	981	913	1,104
<i>Rabbits</i>	56	53	49	47	45	46

These figures do not include the numbers of livestock on Indian Reserves which were as follows for the years 1926-1930.

Numbers of Livestock on Indian Reserves 1926-1929.

	1930	1929	1928	1927	1926
	(thousands)				
<i>Horses</i>	37	40	36	38	37
<i>Cattle</i>	45	43	44	48	39
<i>Sheep</i>	3	3	3	3	2
<i>Swine</i>	10	14	10	11	4
<i>Poultry</i>	144	171	130	142	94

TRADE

COUNTRIES	NOVEMBER				FOUR MONTHS (August 1-November 30)				TWELVE MONTHS (August 1-July 3)	
	EXPORTS		IMPORTS		EXPORTS		IMPORTS		EXPORTS	IMPORTS
	1930	1929	1930	1929	1930	1929	1930	1929	1929-30	1929-30
Wheat. — Thousand centals (1 cental = 100 lbs).										
<i>Exporting Countries:</i>										
Bulgaria . . . . .	...	...	...	...	(1) 758	(1) 29	(1) 0	(1) 412	66	930
Hungary	950	908	0	0	2,899	4,940	0	0	9,943	0
Rumania . . . . .	...	...	...	...	(1) 4,879	(1) 104	(1) 4	(1) 22	1,279	33
Yugoslavia	633	1,188	0	0	2,568	9,189	0	2	13,298	2
Canada	18,728	13,468	9	214	63,877	36,440	22	408	93,401	602
United States	1,960	5,990	906	472	24,564	26,383	5,102	1,067	57,274	7,885
Argentina	1,506	4,733	...	...	7,818	41,136	...	...	86,845	...
Chile . . . . .	...	...	...	...	(1) 308	(1) 2	(1) 0	(1) 0	481	0
India	57	7	328	624	1,764	212	875	994	2,758	3,931
Algeria	531	315	22	35	3,855	1,175	73	485	3,206	545
Tunis	104	289	29	7	1,138	2,046	51	53	3,362	99
Australia . . . . .	...	...	...	...	(1) 0,742	(1) 3,803	(1) 0	(1) 0	24,469	0
<i>Importing Countries:</i>										
Germany	51	110	926	2,087	62	1,825	7,729	9,841	2,293	31,528
Austria	22	0	302	542	32	2	1,281	2,202	68	6,455
Belgium	29	112	2,213	1,900	93	417	9,753	9,198	765	25,779
Denmark	2	4	291	322	15	62	1,204	1,274	128	2,903
Spain	0	4	0	119	2	4	0	1,922	11	2,152
Estonia	0	0	88	40	0	0	243	185	0	540
Irish Free State . . . . .	...	...	...	...	(1) 7	(1) 0	(1) 1,893	(1) 1,733	0	5,547
France . . . . .	...	...	...	...	(1) 943	(1) 7	(1) 9,698	(1) 8,810	8,902	19,599
Gr. Brit. and N. Ir.	44	97	11,601	11,003	245	313	44,130	48,872	1,482	114,048
Greece	0	0	767	1,232	0	0	4,535	3,812	0	12,339
Italy	4	0	5,245	1,047	22	2	16,980	3,754	4	27,084
Latvia . . . . .	...	...	...	...	(1) 0	(1) 0	(1) 401	(1) 437	0	1,523
Norway	—	—	346	315	—	—	1,391	935	—	2,216
Netherlands	15	2	1,409	1,508	40	37	6,005	5,739	231	14,936
Poland	313	4	2	31	798	22	24	134	289	331
Portugal	—	—	9	9	—	—	82	567	—	3,732
Sweden	7	205	320	496	22	509	1,495	2,233	1,003	4,982
Switzerland	0	0	1,124	578	0	0	4,519	3,662	0	9,590
Czechoslovakia	0	11	1,098	346	2	31	2,890	1,340	108	3,602
Japan	—	—	895	957	—	—	2,000	3,040	—	10,922
Syria and Lebanon . . . . .	...	...	...	...	(1) 71	(1) 0	(1) 9	(1) 44	26	146
Egypt . . . . .	...	...	...	...	(1) 2	(1) 4	(1) 115	(1) 0	49	24
Union of South Africa . . . . .	...	...	...	...	(2) 0	(2) 0	(2) 236	(2) 608	0	1,680
New Zealand . . . . .	...	...	...	...	(2) 0	(2) 0	(2) 26	(2) 24	130	170
Totals	24,956	27,445	27,990	24,494	123,312	178,694	124,965	113,789	311,931	315,965
Rye. — Thousand centals (1 cental = 100 lbs).										
<i>Exporting Countries:</i>										
Germany	179	1,532	66	157	1,098	4,967	240	725	10,529	1,922
Bulgaria . . . . .	...	...	...	...	(1) 291	(1) 0	(1) 0	(1) 0	9	0
Hungary	243	240	0	0	569	1,202	0	0	2,919	0
Poland	516	302	0	0	3,618	2,019	0	2	7,293	20
Rumania . . . . .	...	...	...	...	(1) 306	(1) 225	(1) 0	(1) 0	377	0
Czechoslovakia	66	130	33	11	302	437	55	73	1,325	254
Yugoslavia	0	4	2	0	0	18	4	0	33	0
Canada	13	0	0	4	271	97	0	76	194	150
United States	0	9	—	—	46	1,263	—	—	1,378	—
Argentina	20	31	—	—	214	628	—	—	767	—
Algeria	2	4	0	0	18	24	0	4	35	4
<i>Importing Countries:</i>										
Austria	2	0	126	207	7	0	432	899	2	2,857
Belgium	0	0	139	110	11	2	714	320	983	0
Denmark	0	0	734	653	0	2	3,060	2,229	2	6,151
Estonia	0	0	7	83	0	0	97	454	0	1,563
Finland	0	0	445	593	0	0	1,188	1,687	4	3,314
France . . . . .	...	...	...	...	(1) 0	(1) 0	(1) 287	(1) 112	7	181
Italy	0	...	71	...	0	0	243	33	0	324
Latvia . . . . .	...	...	...	...	(1) 0	(1) 0	(1) 128	(1) 551	7	2,191
Lithuania	7	0	0	...	18	0	0	24	86	24
Norway	0	0	313	289	0	0	917	1,281	0	3,605
Netherlands	9	7	434	269	29	31	1,664	968	90	2,906
Sweden	0	0	66	198	0	9	351	791	11	2,240
Switzerland	0	0	22	18	0	0	79	68	0	154
Totals	1,966	2,259	2,438	2,619	6,798	19,924	9,399	10,276	25,973	28,843

(1) (2) See notes page 32.

COUNTRIES	NOVEMBER				FOUR MONTHS (August 1-November 30)				TWELVE MONTHS (August 1-July 31)	
	EXPORTS		IMPORTS		EXPORTS		IMPORTS		EXPORTS	IMPORTS
	1930	1929	1930	1929	1930	1929	1930	1929	1929-30	1929-30
Wheat flour. — Thousand centals (1 cental = 100 lbs).										
<i>Exporting Countries:</i>										
Germany	11	130	9	82	108	560	71	201	1,226	710
Belgium	16	24	24	66	60	180	90	858	251	564
Bulgaria					(1)	31 (1)	4 (1)	0 (1)	0	7
Spain	7	7	0	0	15	81	0	0	0	0
France					(1)	1,482 (1)	9 (1)	187 (1)	79	3,796
Hungary	584	756	0	0	2,105	2,584	0	0	5,664	0
Italy	112	192	20	4	870	560	64	15	1,407	93
Poland	82	13	2	2	254	87	9	15	154	35
Rumania					(1)	154 (1)	75 (1)	0 (1)	0	317
Yugoslavia	13	60	0	0	51	143	2	0	320	2
Canada	1,530	1,054	2	15	5,704	4,367	20	49	13,285	143
United States	2,268	2,260	0	0	10,046	9,301	0	2	25,342	4
Argentina	141	183			611	967			2,381	
Chile					(1)	55 (1)	60 (1)	0 (1)	4	203
India	55	97	0	0	317	375	0	0	1,113	2
Japan	300	302	20	24	1,252	963	128	66	2,304	379
Algeria	44	2	2	7	152	37	9	26	134	57
Tunis	24	13	0	0	82	51	7	0	159	4
Australia					(1)	2,553 (1)	2,310 (1)	0 (1)	0	9,165
<i>Importing Countries:</i>										
Austria	0	0	260	280	2	2	694	1,056	4	3,770
Denmark	2	2	174	162	11	13	624	586	31	1,440
Estonia	0	0	11	9	0	0	46	44	0	123
Irish Free State					(1)	15 (1)	15 (1)	968 (1)	915	64
Finland			344	311			1,243	985		2,487
Gr. Britain and N. Ir.	465	428	1,045	994	1,702	1,642	4,963	4,387	4,727	12,467
Greece			13	53			82	220		494
Norway	0	0	160	143	0	0	624	540	2	1,376
Netherlands	7	24	390	225	37	66	1,391	785	203	2,760
Portugal			13	15			55	75		152
Sweden	0	11	4	20	2	42	37	112	90	370
Czechoslovakia	0	0	796	348	4	4	1,775	1,127	13	3,333
Ceylon			42	53			174	159		430
Java and Madura							282 (1)	258		1,142
Indo-China			44	42			159	163		549
Syria and Lebanon					(1)	2 (1)	0 (1)	29 (1)	97	425
Egypt					(1)	0 (1)	2 (1)	849 (1)	1,036	4
Union of South Africa					(2)	0 (2)	0 (2)	42 (2)	108	31
New Zealand					(2)	0 (2)	0 (2)	36 (2)	81	4
Totals	5,667	5,567	3,365	2,854	27,267	24,340	14,677	13,449	72,467	42,765
Barley. — Thousand centals (1 cental = 100 lbs).										
<i>Exporting Countries:</i>										
Bulgaria					(1)	597 (1)	174 (1)	(1)	0	309
Spain	18	9	0	2	71	46	0	4	163	0
Hungary	99	366	0	0	203	1,411	0	0	2,363	0
Lithuania	0	2	0	0	7	2	0	0	0	143
Poland	328	728	0	0	1,650	2,189	0	2	5,794	2
Rumania					(1)	14,632 (1)	13,741 (1)	0 (1)	0	81,305
Czechoslovakia	560	580	0	0	2,041	1,228	0	2	2,518	15
Yugoslavia	0	40	29	26	9	192	82	90	282	159
Canada	542	383	0	0	864	816	0	4	1,250	9
United States	421	390			2,119	6,094			8,774	
Argentina	181	104			979	980			2,557	
Chile					(1)	137 (1)	101 (1)	0 (1)	0	897
India	0	0	0	0	2	2	0	0	26	11
Syria and Lebanon					(1)	148 (1)	106 (1)	2 (1)	9	503
Algeria	214	71	0	0	833	1,394	4	121	2,202	130
Egypt					(1)	2 (1)	29 (1)	22 (1)	0	128
Tunis	9	406	4	4	146	2,083	132	18	2,652	53
Australia					(1)	243 (1)	58 (1)	0 (1)	0	324
<i>Importing Countries:</i>										
Germany	9	2	1,167	4,967	42	15	4,108	18,366	1,089	49,761
Austria	0	0	190	201	0	0	752	648	9	1,653
Belgium	11	4	1,058	983	46	33	3,446	2,708	176	7,887
Denmark	234	218	2,258	161	445	564	5,415	362	1,232	4,466
Estonia			0	7			13	29		68
Irish Free State					(1)	0 (1)	13 (1)	7 (1)	2	26
France					(1)	7 (1)	31 (1)	1,840 (1)	642	348
Gr. Britain and N. Ir.	4	0	2,732	1,272	11	20	7,588	6,854	33	14,454
Greece			13	64			35	227		401
Italy	0	0	99	29	0	0	292	38	9	368
Latvia	0	0	24	2	0	0	49	57	0	128
Norway	0	0	53	68	0	0	249	251	0	752
Netherlands	33	42	1,814	580	104	141	5,739	2,804	487	7,937
Switzerland	0	0	295	254	0	0	987	802	0	1,018
Totals	2,663	3,195	9,725	8,358	25,328	31,366	39,272	34,156	65,639	91,966

(1) (2) See notes page 52.

COUNTRIES	NOVEMBER				FOUR MONTHS (August 1-November 30)				TWELVE MONTHS (August 1-July 31)	
	EXPORTS		IMPORTS		EXPORTS		IMPORTS		EXPORTS	IMPORTS
	1930	1929	1930	1929	1930	1929	1930	1929	1929-30	1929-30
Oats. — Thousand centals (1 cental = 100 lbs).										
<i>Exporting Countries:</i>										
Germany	11	1,349	33	20	190	5,152	58	271	15,245	620
Irish Free State . . . . .	...	...	...	...	(1) 75	(1) 212	(1) 44	(1) 7	661	121
Hungary	2	86	0	0	9	450	0	0	728	0
Poland	7	99	0	2	75	518	0	40	1,803	66
Rumania . . . . .	...	...	...	...	(1) 699	(1) 456	(1) 0	(1) 0	1,834	0
Czechoslovakia	126	163	0	4	454	456	4	26	1,345	128
Yugoslavia	0	4	2	0	0	7	68	0	9	51
Canada	130	44	15	134	377	311	225	600	679	1,182
United States	15	229	7	4	62	1,120	20	9	1,576	49
Argentina	873	260	—	—	3,903	1,027	—	—	6,563	—
Chile . . . . .	...	...	...	...	(1) 721	(1) 128	(1) 0	(1) 0	622	0
Algeria	152	42	0	13	419	187	86	106	503	128
Tunis	60	86	0	0	311	496	0	0	860	0
<i>Importing Countries:</i>										
Austria	0	0	172	240	2	0	549	873	2	2,707
Belgium	0	0	419	229	0	0	1,484	800	4	2,773
Denmark	0	0	97	187	2	2	262	527	20	2,800
Estonia	0	0	7	11	0	0	26	18	0	106
Finland	0	0	0	46	0	0	22	134	0	476
France . . . . .	...	...	...	...	(1) 7	(1) 7	(1) 512	(1) 597	77	1,673
Gr. Brit. and N. Irel.	4	4	1,305	573	22	15	3,591	2,805	306	9,658
Greece	—	—	0	26	—	—	0	93	—	207
Italy	0	0	395	101	0	0	1,188	437	0	1,700
Latvia . . . . .	...	...	...	...	(1) 0	(1) 0	(1) 13	(1) 79	163	99
Norway	0	0	0	9	0	0	0	57	2	170
Netherlands	0	13	419	403	15	46	1,030	1,367	185	3,728
Sweden	0	2	93	143	11	13	333	589	60	1,200
Switzerland	0	0	465	496	0	0	1,398	1,446	0	4,398
Australia . . . . .	...	...	...	...	(1) 20	(1) 4	(1) 0	(1) 2	49	4
Totals	1,380	2,381	3,429	2,641	7,464	10,616	10,936	10,913	33,296	34,134

Maize. — Thousand centals (1 cental = 100 lbs).

COUNTRIES	NOVEMBER				FOUR MONTHS (August 1-November 30)				TWELVE MONTHS (August 1-July 31)	
	EXPORTS		IMPORTS		EXPORTS		IMPORTS		EXPORTS	IMPORTS
	1930	1929	1930	1929	1930	1929	1930	1929	1929-30	1929-30
Maize. — Thousand centals (1 cental = 100 lbs).										
<i>Exporting Countries:</i>										
Bulgaria . . . . .	...	...	...	...	1929-30	1928-29	1929-30	1928-29	—	—
Hungary	51	401	53	0	4,023	1,373	0	0	—	—
Rumania . . . . .	...	...	...	...	3,351	567	132	593	—	—
Yugoslavia	677	1,415	2	4	28,424	2,218	2	60	—	—
United States	60	375	168	...	12,013	955	33	606	—	—
Argentina	10,274	6,841	—	—	4,303	22,664	708	196	—	—
Brazil . . . . .	...	...	...	...	90,197	113,721	—	—	—	—
Java and Madura	2	0	—	—	(2) 326	(2) 119	—	—	—	—
Indo-China	743	593	—	—	1,759	2,773	—	—	—	—
Syria and Lebanon . . . . .	...	...	...	...	2,330	2,732	—	—	—	—
Egypt . . . . .	...	...	...	...	434	134	35	35	—	—
Union of South Africa . . . . .	...	...	...	...	97	1,305	33	15	—	—
<i>Importing Countries:</i>										
Germany	0	0	331	1,556	(2) 0,423	(2) 6,210	(2) 0	(2) 0	—	—
Austria	0	2	320	273	18	13	4,312	2,538	—	—
Belgium	22	18	1,124	941	220	439	12,908	12,452	—	—
Denmark	0	0	511	408	0	0	6,250	3,673	—	—
Spain	0	0	108	680	0	0	3,840	5,922	—	—
Estonia	—	—	0	0	—	—	0	157	—	—
Irish Free State . . . . .	...	...	...	...	20	44	8,047	7,981	—	—
Finland . . . . .	...	...	15	20	—	—	137	163	—	—
France . . . . .	...	...	...	...	46	11	17,353	18,426	—	—
Gr. Brit. and N. Ir.	183	84	4,848	3,339	2,150	1,944	36,306	37,834	—	—
Greece	—	—	2	18	—	—	185	602	—	—
Italy	0	0	1,446	833	7	13	15,252	20,287	—	—
Norway	—	—	240	254	—	—	2,676	1,080	—	—
Netherlands	13	22	2,628	1,775	626	201	23,298	22,320	—	—
Poland	0	0	46	35	4	7	392	381	—	—
Portugal	—	—	322	130	—	—	1,442	707	—	—
Sweden	—	—	452	93	—	—	2,202	1,684	—	—
Switzerland	0	0	317	273	0	0	2,542	2,557	—	—
Czechoslovakia	0	0	582	273	2	0	5,443	4,901	—	—
Canada	0	0	688	174	4	9	7,573	8,082	—	—
Japan	—	—	82	108	—	—	1,486	955	—	—
Totals	13,025	9,811	14,385	11,285	163,795	157,344	169,970	169,497	—	—

(2) (a) See notes page 52.

COUNTRIES	NOVEMBER				ELEVEN MONTHS (January 1-November 30)				TWELVE MONTHS (January 1-Dec. 31)	
	EXPORTS		IMPORTS		EXPORTS		IMPORTS		EXPORTS	IMPORTS
	1930	1929	1930	1929	1930	1929	1930	1929	1929	1929
Rice. — Thousand centals (1 cental = 100 lbs).										
<i>Exporting Countries:</i>										
Spain	247	152	0	0	1,105	635	0	0	864	0
Italy	505	745	4	0	4,171	3,635	134	520	4,233	531
United States	386	344	35	20	2,108	3,510	265	291	3,933	359
India	2,430	3,071	7	2	55,065	43,288	75	575	45,149	578
Indo-China	1,036	2,048	—	—	23,415	30,673	—	—	32,433	—
Siam	990	1,369	—	—	19,022	21,107	—	—	22,698	—
Egypt	—	—	—	—	(1) 844	(1) 1,135	(1) 106	(1) 302	1,702	359
<i>Importing Countries:</i>										
Germany	101	220	355	437	1,482	2,405	5,227	6,371	2,557	6,576
Austria	0	0	57	57	0	0	551	562	0	631
Belgium	0	2	82	49	9	24	950	809	26	875
Denmark	0	0	20	20	0	0	126	150	0	174
Estonia	—	—	2	2	—	—	35	64	—	64
Irish Free State	—	—	—	—	(1) 0	(1) 0	(1) 37	(1) 42	—	49
France	—	—	—	—	(1) 1,634	(1) 1,748	(1) 4,706	(1) 5,022	2,156	5,885
Gr. Brit. and N. Ir.	11	20	172	260	205	249	2,357	2,480	262	2,608
Greece	—	—	46	51	—	—	474	494	—	547
Hungary	0	2	37	55	7	29	381	442	31	620
Latvia	—	—	—	—	(1) 7	(1) 53	(1) 185	—	7	192
Lithuania	—	0	2	—	—	0	29	53	—	53
Norway	—	0	9	13	—	0	97	93	—	106
Netherlands	172	179	130	137	1,907	1,856	3,426	3,538	2,016	3,642
Poland	7	9	2	20	112	62	1,175	1,241	66	1,241
Portugal	—	—	121	60	—	—	906	849	—	908
Sweden	—	—	0	0	—	—	161	117	—	117
Switzerland	0	0	49	62	0	0	364	375	0	427
Czechoslovakia	0	0	62	79	0	0	908	966	0	1,065
Yugoslavia	0	0	64	42	2	2	423	390	2	562
Canada	0	0	49	71	0	4	536	525	4	560
Chile	—	—	—	—	—	(1) 450	(1) 357	—	—	500
Ceylon	0	0	639	877	7	13	9,755	10,538	13	10,909
Java and Madura	—	—	—	—	(1) 90	(1) 185	(1) 5,018	(1) 17,178	207	7,624
Japan	569	13	408	302	858	88	3,953	3,774	101	4,057
Syria and Lebanon	—	—	—	—	(1) 2	(1) 0	(1) 238	(1) 234	0	304
Algeria	0	0	11	7	7	13	90	82	18	95
Tunis	0	0	2	2	0	0	20	20	0	22
Union of S. Africa	—	—	—	—	(2) 0	(2) 0	(2) 725	(2) 644	0	866
Australia	—	—	—	—	(1) 62	(1) 61	(1) 68	(1) 110	77	445
New Zealand	—	—	—	—	(2) 0	(2) 0	(2) 55	(2) 53	0	62
Totals	6,544	8,174	2,365	2,627	112,211	110,727	43,963	59,564	118,759	53,743
Linseed. — Thousand centals (1 cental = 100 lbs).										
<i>Exporting Countries:</i>										
Estonia	26	31	0	0	51	49	2	24	64	24
Lithuania	123	181	—	—	351	492	—	—	545	—
Argentina	2,061	644	—	—	24,696	33,424	—	—	35,700	—
India	159	681	0	0	5,666	5,289	0	2	5,514	2
Tunis	0	0	0	0	9	22	0	0	22	0
<i>Importing Countries:</i>										
Germany	0	24	425	388	26	77	4,965	6,830	84	6,967
Belgium	2	15	170	163	66	205	1,409	2,357	209	2,515
Denmark	—	—	9	13	—	—	317	322	—	322
Spain	—	—	31	22	—	—	412	397	—	419
Finland	0	0	0	7	0	0	73	170	0	176
France	—	—	—	—	(1) 13	(1) 9	(1) 3,651	(1) 4,248	15	4,725
Gr. Brit. and N. Irel.	0	2	617	240	9	9	4,352	6,124	9	6,396
Greece	0	0	2	2	2	4	62	88	4	88
Hungary	7	2	0	2	141	42	106	68	44	71
Italy	0	0	163	49	0	0	1,030	1,142	2	1,301
Latvia	—	—	—	—	(1) 132	(1) 174	(1) 90	(1) 306	335	375
Norway	—	—	0	11	—	—	806	324	—	324
Netherlands	4	7	483	432	141	141	5,362	7,659	148	7,960
Poland	4	62	0	0	31	284	143	459	322	459
Sweden	—	—	40	35	—	—	763	767	—	778
Czechoslovakia	0	0	37	84	18	9	421	600	11	624
Yugoslavia	0	0	0	4	2	0	121	180	0	130
Canada	236	49	0	99	500	403	452	741	476	769
United States	—	—	216	944	—	—	6,969	12,863	—	13,576
Japan	—	—	4	22	—	—	117	340	—	351
Australia	—	—	—	—	(1) 0	(1) 0	(1) 318	(1) 607	0	586
Totals	2,622	1,696	2,197	2,517	31,854	46,633	31,436	46,458	43,504	48,928

(1) (2) See notes page 52.

COUNTRIES	NOVEMBER				ELEVEN MONTHS (January 1-NOVEMBER 30)				TWELVE MONTHS (January 1-Dec. 31)	
	EXPORTS		IMPORTS		EXPORTS		IMPORTS		EXPORTS	IMPORTS
	1930	1929	1930	1929	1930	1929	1930	1929	1929	1929
Butter. — (Thousand lbs.).										
<i>Exporting Countries:</i>										
Austria	558	511	2	2	3,940	1,967	518	1,085	2,116	1,088
Denmark	27,653	28,016	40	57	343,876	322,875	1,338	1,360	350,620	1,424
Estonia	1,792	1,852	0	0	20,300	25,267	0	0	27,247	0
Irish Free State	—	—	—	—	(1) 55,032	(1) 55,596	(1) 2,054	(1) 4,043	62,836	4,621
Finland	2,430	2,430	4	0	34,926	33,978	7	2	36,610	2
France	—	—	—	—	(1) 9,769	(1) 14,749	(1) 10,269	(1) 8,102	16,713	9,654
Hungary	229	368	0	0	3,172	913	40	143	1,191	143
Latvia	—	—	—	—	(1) 35,819	(1) 20,786	(1) 37	(1) 40	32,622	49
Lithuania	880	802	—	—	15,494	8,455	—	—	9,004	—
Netherlands	6,779	6,777	787	452	87,550	97,570	3,609	4,127	104,325	4,409
Poland	1,592	2,853	0	0	25,708	31,103	26	110	33,248	112
Sweden	4,332	4,592	0	0	54,935	50,457	18	24	54,983	24
U. S. S. R.	—	—	—	—	(3) 13,662	(3) 48,392	—	—	56,109	—
Argentina	5,540	5,485	—	—	41,302	31,056	—	—	37,547	—
India	55	62	42	20	492	452	260	207	522	229
Syria and Lebanon	—	—	—	—	(1) 1,753	(1) 1,790	(1) 185	(1) 207	2,116	238
Australia	—	—	—	—	(1) 86,635	(1) 71,884	(1) 2	(1) 4	102,917	4
New Zealand	22,040	22,302	—	—	188,816	165,909	—	—	183,639	—
<i>Importing Countries:</i>										
Germany	33	9	26,131	24,409	556	324	272,230	274,375	337	296,230
Belgium	245	183	2,125	908	2,474	2,635	19,302	8,128	2,477	9,559
Spain	22	13	49	49	157	163	324	348	175	408
Gr. Brit. and N. Irel.	4,987	798	51,668	49,924	16,321	13,461	660,704	657,108	14,839	717,539
Italy	—	—	106	154	—	—	1,259	1,387	—	1,537
Norway	40	42	337	51	1,748	1,616	2,599	1,737	1,706	1,909
Switzerland	—	2	146	212	231	1,191	1,477	1,250	1,191	1,851
Czechoslovakia	2	7	1,265	1,155	40	154	16,533	14,994	150	16,649
Canada	134	207	33	2	677	562	712	831	717	886
United States	110	101	126	3,023	1,080	1,321	38,202	20,661	1,400	35,929
Ceylon	154	254	101	112	2,776	3,662	2,374	2,646	3,013	2,773
Java and Madura	—	—	46	68	—	—	648	648	—	786
Japan	—	—	—	—	—	—	(1) 6,098	(1) 7,101	—	7,712
Algeria	—	—	26	46	—	—	556	421	—	503
Egypt	4	7	423	201	73	60	3,040	2,015	64	2,317
Tunis	—	—	—	—	(1) 42	(1) 26	(1) 1,020	(1) 1,288	29	1,649
Totals	79,690	78,575	83,532	86,978	1,038,467	1,005,298	1,078,656	1,024,099	1,141,711	1,126,396
Cheese. — (Thousand lbs.).										
<i>Exporting Countries:</i>										
Denmark	1,003	1,237	79	68	11,047	13,689	708	578	14,513	648
Finland	633	465	4	4	4,422	4,568	29	35	4,837	44
Italy	3,569	8,737	772	1,025	73,813	63,116	11,828	13,118	71,902	13,973
Lithuania	203	150	0	0	1,795	1,197	9	11	1,299	11
Norway	187	132	73	84	1,246	1,257	655	743	1,347	840
Netherlands	15,695	16,085	126	119	192,740	197,484	1,376	1,312	211,237	1,444
Poland	373	370	90	101	3,009	3,620	992	1,276	3,907	1,351
Switzerland	4,811	5,331	357	311	61,496	65,178	3,876	3,060	69,737	3,437
Czechoslovakia	1,047	875	231	212	7,238	6,385	2,857	3,106	7,050	3,349
Yugoslavia	721	500	22	35	4,250	4,738	280	342	4,890	370
Canada	1,468	13,024	247	267	62,929	87,982	1,660	1,887	92,445	2,103
Australia	—	—	—	—	(1) 4,941	(1) 4,277	(1) 146	(1) 514	5,135	597
New Zealand	20,148	18,098	0	0	173,535	171,381	0	0	197,562	7
<i>Importing Countries:</i>										
Germany	611	608	10,432	11,634	4,905	4,548	128,583	137,232	4,919	146,570
Austria	829	137	392	353	4,074	2,776	5,320	5,404	2,923	5,716
Belgium	64	73	4,092	3,988	822	840	47,377	42,590	899	46,456
Spain	13	7	527	743	190	60	5,157	6,105	66	6,971
Irish Free State	—	—	—	—	(1) 130	(1) 119	(1) 1,940	(1) 1,993	164	2,410
France	—	—	—	—	(1) 32,401	(1) 32,723	(1) 52,889	(1) 42,615	40,325	51,079
Gr. Brit. and N. Irel.	754	972	27,520	28,074	8,270	9,218	309,889	310,258	9,976	385,386
Greece	31	29	159	207	262	355	2,213	2,906	441	3,314
Hungary	11	2	31	49	84	40	366	505	40	545
Portugal	—	—	66	134	—	—	789	831	—	974
Sweden	—	—	198	157	—	—	1,265	1,263	—	1,420
United States	119	146	5,042	6,903	1,947	2,747	63,044	69,366	3,020	76,382
India	0	0	154	181	—	4	1,027	1,122	—	1,237
Java and Madura	—	—	—	—	—	—	(1) 1,372	(1) 1,907	—	1,821
Syria and Lebanon	—	—	—	—	(1) 123	(1) 194	(1) 534	(1) 560	198	708
Algeria	13	26	935	948	199	183	9,310	7,624	194	8,468
Egypt	—	—	—	—	(1) 57	(1) 106	(1) 6,140	(1) 5,318	123	6,563
Tunis	4	0	157	172	26	13	1,579	1,510	13	1,695
Totals	57,397	67,964	51,706	53,769	636,867	664,869	663,211	664,840	749,547	725,894

(1) (3) See notes page 52.

COUNTRIES	NOVEMBER				FOUR MONTHS (August 1-November 30)				TWELVE MONTHS (August 1-July 31)	
	EXPORTS		IMPORTS		EXPORTS		IMPORTS		EXPORTS	IMPORTS
	1930	1929	1930	1929	1930	1929	1930	1929	1929-30	1929-30
Cotton. — Thousand cents (1 cental = 100 lbs).										
<i>Exporting Countries:</i>										
United States	4,930	5,006	18	170	17,099	17,386	— 73	520	5,927	1,889
Argentina	22	0	—	—	188	159	—	—	538	—
Brazil	—	—	—	—	(2) 60	(2) 174	—	—	1,351	—
India	893	820	60	29	3,891	3,267	—	238	15,172	600
Egypt	—	—	—	—	(1) 1,129	(1) 1,387	(1)	0	6,307	0
<i>Importing Countries:</i>										
Germany	174	161	1,034	1,329	633	620	3,274	3,107	1,885	8,944
Austria	0	0	40	00	0	2	103	190	2	558
Belgium	11	7	104	130	46	42	518	631	106	2,037
Denmark	—	—	18	17	—	—	46	44	—	146
Spain	2	7	172	194	7	22	644	556	44	2,207
Estonia	0	0	7	13	0	0	31	49	0	130
Finland	0	0	20	15	0	0	62	57	2	143
France	—	—	—	—	(1) 163	(1) 148	(1) 1,709	(1) 1,548	664	8,223
Gr. Brit. and N. Irel.	31	49	1,385	1,916	209	240	3,494	4,528	709	13,181
Greece	0	0	22	4	0	0	66	20	2	68
Hungary	—	—	40	29	—	—	90	70	—	291
Italy	0	2	134	456	2	4	1,060	1,541	11	5,148
Latvia	—	—	—	—	(1) 0	(1) 0	(1) 26	(1) 22	0	77
Norway	—	—	4	2	—	—	18	15	—	46
Netherlands	0	0	82	101	2	2	289	295	7	1,027
Poland	2	2	128	117	7	11	604	474	26	1,215
Portugal	—	—	42	31	—	—	106	119	—	401
Sweden	—	—	46	84	—	—	163	159	—	516
Switzerland	0	0	32	30	0	0	201	205	0	639
Czechoslovakia	13	15	247	262	60	64	847	853	170	2,701
Yugoslavia	0	0	11	20	0	0	62	55	—	198
Canada	—	—	161	183	—	—	384	307	—	1,043
Japan	42	2	1,191	902	205	64	3,069	3,441	417	13,073
Algeria	0	0	0	0	2	2	0	0	33	4
Totals	6,129	6,671	5,337	6,137	23,313	23,594	17,246	19,116	63,493	64,505

Wool. — (Thousand lbs).

COUNTRIES	THREE MONTHS (September 1-November 30)				THREE MONTHS (September 1-November 30)				Twelve months (Sept. 1-August 31)	
	EXPORTS		IMPORTS		EXPORTS		IMPORTS		EXPORTS	IMPORTS
	1930	1929	1930	1929	1930	1929	1930	1929	1929-30	1929-30
<i>Exporting Countries:</i>										
Spain	396	1,155	183	104	2,163	3,120	915	498	10,249	5,781
Irish Free State	—	—	205	115	(1) 1,276	(1) 2,449	(1) 132	(1) 227	10,015	994
Hungary	216	690	—	—	1,025	2,057	335	271	8,062	1,561
Argentina	(a) 10,910	12,410	—	—	29,035	19,963	—	—	301,402	—
Chile	(b) 1,933	—	—	—	(1) 19,881	(1) 192	—	—	20,318	—
India	3,144	5,423	51	117	7,039	15,825	384	459	47,825	4,189
Syria and Lebanon	—	—	—	—	(1) 1,799	(1) 3,993	(1) 1,334	(1) 408	7,485	1,810
Algeria	946	1,071	93	110	8,054	3,899	273	267	14,997	1,905
Egypt	—	—	—	—	(1) 461	(1) 747	(1) 0	(1) 0	2,533	2
Tunis	9	29	73	90	62	137	324	293	549	1,113
Un. of S. Africa	(a) —	—	—	—	(2) 6,334	(2) 2,258	—	—	288,877	—
Greece	(b) —	—	—	—	(2) 428	(2) 220	(2) 49	(2) 57	7,401	293
Australia	(a) —	—	—	—	(1) 133,964	(1) 120,604	(1) 183	(1) 66	738,152	2,837
New Zealand	(b) 1,160	2,037	0	0	(1) 7,476	(1) 7,602	(1) 35	(1) 40	47,375	664
Germany	(a) 628	1,411	0	2	7,983	4,725	0	2	156,771	13
Austria	(b) —	—	—	—	7,238	6,995	0	7	43,473	7
<i>Importing Countries:</i>										
Germany	(a) 1,021	996	12,324	10,082	2,277	4,425	48,489	29,421	11,188	293,996
Austria	(b) 1,142	1,777	2,383	3,221	3,221	3,444	7,209	7,654	14,966	28,609
Belgium	(a) 42	26	1,392	54	51	106	2,458	2,010	364	15,521
Denmark	(b) 1,250	1,486	6,784	8,461	3,500	2,824	15,510	26,372	9,006	166,963
Finland	(a) 1,779	2,762	370	370	5,677	7,410	959	858	25,946	4,945
France	(b) 0	13	406	271	0	42	926	1,151	130	3,413
Gr. Britain and N. Ir.	11	0	207	134	18	2	620	536	86	1,028
Greece	—	—	—	—	(1) 7,055	(1) 11,387	(1) 39,586	(1) 34,430	55,879	548,243
Italy	(a) 14,716	10,282	40,276	43,725	59,126	59,397	95,044	88,847	333,774	779,872
Norway	(b) 7	9	247	302	132	99	719	591	659	2,714
Poland	(a) 168	95	2,280	1,978	608	525	12,207	9,112	2,024	95,006
Sweden	(b) 225	209	1,054	1,232	796	918	2,952	3,860	2,685	13,109
Switzerland	(a) 84	112	115	203	251	357	388	547	908	1,885
Yugoslavia	(b) 140	214	234	245	467	527	1,224	1,208	2,112	10,532
Canada	(a) 40	57	493	573	82	163	1,254	1,642	527	6,257
Japan	(b) 130	185	1,570	2,068	410	754	6,228	6,385	3,338	34,743
United States	—	—	1,120	1,078	—	—	2,961	3,572	—	15,745
Algeria	2	4	450	589	7	11	3,233	2,776	55	19,178
Egypt	119	174	2,008	1,056	401	873	7,868	5,681	2,273	36,149
Greece	(a) 7	2	505	267	22	40	1,080	831	84	6,676
Italy	(b) 73	798	840	752	761	2,015	1,903	2,200	6,191	9,778
Poland	(a) 161	139	8,547	19,511	439	370	26,396	57,131	2,114	203,631
Sweden	(b) 0	9	6,550	4,475	2	15	17,417	8,065	24	100,990
Totals	44,338	54,533	99,657	107,592	320,494	297,154	303,645	297,944	2,179,896	2,431,143

(a) = Wool, greasy; (b) = Wool, scoured.

(1) (2) See notes page 52.

COUNTRIES	NOVEMBER		FIVE MONTHS (July 1-Nov. 30)		TWELVE MONTHS (July 1- June 30)	COUNTRIES	NOVEMBER		FIVE MONTHS (July 1-Nov. 30)		TWELVE MONTHS (July 1- June 30)
	1930	1929	1930	1929	1929-30		1930	1929	1930	1929	1929-30
Coffee. (Thousand lbs.).						Tea. (Thousand lbs.).					
Exports.						Exports.					
<i>Exporting Countries:</i>						<i>Exporting Countries:</i>					
Brazil . . . . .	...	...	(2)520,028	(2)506,183	1,995,631	Ceylon	18,686	19,119	92,134	98,132	251,286
India	802	282	4,599	1,810	31,698	India	46,549	50,003	228,347	249,853	369,752
Java and Madura .	2,209	3,479	30,620	36,925	55,704	Java and Madura .	13,878	13,764	56,776	56,392	154,582
						Japan	2,249	1,733	13,380	17,966	24,835
<i>Importing Countries:</i>						<i>Importing Countries:</i>					
Germany	115	57	245	168	470	Belgium	7	2	15	9	26
Belgium	101	84	648	542	1,021	Irish Free State .	...	...	(1) 53 (1)	64	106
France . . . . .	...	...	(1) 53 (1)	13	22	France . . . . .	...	...	(1) 13 (1)	26	57
Netherlands	1,413	1,076	8,029	8,424	21,268	Gr. Brit. and N. Ir.	7,203	9,279	38,488	42,774	95,771
Portugal	68	49	276	200	571	Netherlands	9	4	40	15	53
Switzerland	2	11	115	40	227	United States . . .	26	60	234	260	542
Canada	7	7	29	37	79	Syria and Lebanon .	...	...	(1) 9 (1)	18	20
United States	2,008	1,272	10,701	5,648	16,149	Algeria	4	7	7	11	18
Ceylon	26	77	23 (1)	373	719	Union of S. Africa .	...	...	(2) 24 (2)	24	70
Syria and Lebanon . .	...	...	(1) 13 (1)	29	82	Australia . . . . .	...	...	(1) 403 (1)	584	1,702
Australia . . . . .	...	...	(1) 22 (1)	26	62	New Zealand . . . .	...	...	(1) 33 (1)	26	84
Totals					2,123,763	Totals	88,701	93,971	429,856	466,154	899,012
Imports.						Imports.					
<i>Importing Countries:</i>						<i>Importing Countries:</i>					
Germany	25,754	16,993	144,943	119,927	313,807	Germany	822	780	5,604	5,071	12,807
Austria	1,715	1,521	8,620	8,049	19,332	Austria	159	157	549	564	1,199
Belgium	6,164	6,393	12,593	34,710	94,649	Belgium	55	46	258	251	617
Denmark	5,031	4,356	24,099	23,283	58,513	Denmark	71	79	498	473	1,195
Spain	4,967	4,909	23,962	18,927	52,666	Spain	22	35	134	104	355
Estonia	37	40	150	161	293	Estonia	22	13	98	60	148
Irish Free State . . .	...	...	(1) 130 (1)	108	463	Irish Free State . .	...	...	(1) 8,329 (1)	7,632	23,310
Finland	4,348	3,014	21,839	16,925	38,614	Finland	29	15	112	106	278
France . . . . .	...	...	(1) 132,201 (1)	122,117	385,500	France . . . . .	...	...	(1) 996 (1)	1,014	3,305
Gr. Britain and N.						Gr. Britain and N.					
Ireland	2,875	2,976	15,437	15,490	36,069	Ireland	48,711	60,894	264,456	281,172	553,350
Greece	992	1,019	5,318	4,991	12,452	Greece	77	75	359	333	584
Hungary	578	604	3,073	3,503	8,128	Hungary	84	110	355	437	714
Italy	8,709	6,158	40,261	42,283	102,592	Italy	37	44	115	128	337
Latvia . . . . .	...	...	(1) 119 (1)	106	331	Latvia . . . . .	...	...	(1) 62 (1)	79	203
Lithuania	46	46	214	194	428	Lithuania	15	15	77	77	174
Norway	3,523	2,694	15,232	12,639	34,335	Norway	31	35	161	165	375
Netherlands	8,642	8,159	42,781	43,773	98,986	Netherlands	2,418	2,216	12,439	12,176	29,368
Poland	1,428	1,334	7,397	7,496	17,668	Poland	381	377	1,861	1,852	4,434
Portugal	1,149	994	4,374	3,516	9,978	Portugal	49	60	247	284	686
Sweden	7,857	8,982	42,071	43,731	99,162	Sweden	73	86	364	373	877
Switzerland	2,110	2,714	11,319	11,671	31,017	Switzerland	141	95	721	664	1,567
Czechoslovakia . . .	2,313	2,568	11,116	11,502	31,458	Czechoslovakia . . .	168	172	736	703	1,396
Yugoslavia	1,587	2,275	8,408	10,020	21,713	Yugoslavia	84	115	390	507	776
Canada	2,575	2,469	12,088	10,944	29,013	Canada	6,175	3,572	20,946	17,258	46,767
United States	127,604	108,523	610,989	592,582	1,562,080	United States	7,566	9,087	41,343	42,130	86,399
Chile . . . . .	...	...	(1) 3,702 (1)	4,087	12,597	Chile . . . . .	...	...	(1) 2,008 (1)	1,895	4,901
Ceylon	132	300	1,437	1,658	3,150	Syria and Lebanon .	...	...	(1) 126 (1)	104	315
Japan	370	309	1,680	1,601	4,004	Algeria	60	284	1,076	1,193	2,524
Syria and Lebanon . .	...	...	(1) 884 (1)	882	2,504	Egypt . . . . .	...	...	(1) 3,547 (1)	5,379	14,978
Algeria	2,006	2,284	12,165	11,100	26,853	Tunis	271	317	1,265	1,407	3,144
Egypt . . . . .	...	...	(1) 3,774 (1)	7,943	27,661	Union of S. Africa .	...	...	(2) 3,510 (2)	1,953	11,080
Tunis	324	320	1,404	1,594	3,470	Australia . . . . .	...	...	(1) 17,776 (1)	16,621	50,784
Un. of S. Africa . . .	...	...	(2) 7,372 (2)	7,604	30,353	New Zealand . . . .	...	...	(2) 4,947 (2)	4,345	12,461
Australia . . . . .	...	...	(1) 1,091 (1)	1,440	4,253						
<i>Exporting Countries:</i>						<i>Exporting Countries:</i>					
India	227	650	2,088	3,669	6,658	India	758	869	2,844	3,880	9,828
						Java and Madura . .	...	...	(1) 4,938 (1)	6,226	14,917
Totals	223,211	195,673	1,264,311	1,199,335	3,180,870	Totals	68,285	79,537	403,237	416,587	896,136

(1) (2) See notes page 52.

COUNTRIES	NOVEMBER		TWO MONTHS (Oct. 1-Nov. 30)		TWELVE MONTHS (Oct. 1-Sept. 30)	COUNTRIES	NOVEMBER		FOUR MONTHS (August 1-Nov. 30)		TWELVE MONTHS (August 1-July 31)
	1930	1929	1930	1929	1929-30		1930	1929	1930	1929	1929-1930
Cacao. (Thousand lbs.).						Total Wheat and Flour (*) (Thousand centals).					
EXPORTS.						a) NET EXPORTS					
Exporting Countries:						Exporting Countries:					
Grenada	...	...	...	...	(3) 8,964	Bulgaria	...	...	(1) 800	(4)	(4)
Dominican Republ.	...	...	(1) 1,340	(1) 681	42,829	Spain	9	(4)	22	(4)	(4)
Brazil	...	...	...	...	162,486	Hungary	1,728	1,914	5,706	8,386	17,494
Ecuador	1,667	2,028	3,552	3,512	39,399	Poland	417	(4)	1,100	(4)	117
Trinidad	...	...	(1) 1,594	(1) 2,427	54,492	Rumania	...	...	(1) 5,079	(1)	181
Venezuela	...	...	(1) 1,548	(1) 1,792	38,773	Yugoslavia	650	1,208	2,630	9,378	13,719
Ceylon	836	1,047	1,495	1,283	8,446	Canada	20,750	14,639	71,553	41,791	110,381
Java and Madura	278	201	679	470	2,833	United States	4,017	8,543	32,858	37,715	83,223
Cameroun	...	...	...	...	(3) 22,221	Argentina	1,693	4,978	8,631	42,413	90,019
Ivory Coast	...	...	...	...	(3) 43,934	Chile	...	...	(1) 379	(1)	75
Gold Coast	33,660	77,363	58,872	112,383	507,506	British India	(4)	(4)	1,312	(4)	309
Nigeria	...	...	...	...	(3) 116,449	Siria and Lebanon	...	...	(1) 26	(4)	(4)
St. Thomas and Principe	1,440	3,175	2,864	8,049	28,107	Algeria	564	273	3,777	705	2,765
Togoland	...	...	...	...	(3) 14,357	Tunis	108	300	1,186	2,061	3,468
						Australia	...	...	(1) 10,146	(1)	6,883
						Totals	29,945	31,915	145,285	149,588	360,581
IMPORTS.						b) NET IMPORTS.					
Importing Countries:						Importing Countries					
Germany	0	0	0	68	216	Germany	873	2,513	7,617	7,538	28,548
Belgium	0	71	13	71	234	Austria	626	915	2,123	3,605	11,407
France	...	...	...	...	37	Belgium	2,106	1,843	9,703	9,079	25,430
Netherlands	1,404	1,292	2,127	3,042	10,970	Bulgaria	...	...	(5)	(1)	377
Poland	0	0	0	11	13	Denmark	518	518	2,006	1,909	4,654
Czechoslovakia	13	0	13	13	20	Spain	(5)	106	(5)	1,876	2,053
United States	450	441	1,393	1,440	7,083	Estonia	104	51	304	245	705
Australia	...	...	...	...	276	Irish Free State	...	...	(1)	3,183	(1)
						Finland	459	414	1,658	1,318	3,320
						France	...	...	(1)	7,028	(1)
						Gr. Brit. and N. Ir.	12,330	11,692	48,233	52,189	122,013
						Greece	785	1,303	4,643	4,105	12,998
						Italy	5,117	798	16,550	3,027	25,327
						Latvia	...	...	(1)	359	(1)
						Norway	547	507	2,222	1,656	4,048
						Netherlands	1,905	1,773	8,871	6,680	18,116
						Poland	(5)	11	(5)	84	(5)
						Portugal	26	29	154	666	3,935
						Sweden	320	315	1,519	1,819	4,365
						Switzerland	1,124	578	4,519	3,662	9,590
						Czechoslovakia	2,158	800	5,258	2,806	7,021
						Ceylon	56	71	231	212	575
						India	198	487	(5)	282	(5)
						Indochina	60	55	212	223	732
						Japan	509	586	1,188	1,843	8,356
						Java and Madura	...	...	(1)	377	(1)
						Syria and Lebanon	...	...	(5)	(1)	174
						Egypt	...	...	(1)	1,243	(1)
						Union of South Afr.	...	...	(2)	291	(2)
						New Zealand	...	...	(2)	73	(2)
						Totals	29,910	25,335	129,065	129,167	324,867

(*) Flour reduced to grain on the basis of the coefficient: 1,000 centals of flour = 1,333.33 centals of grain.

a) Excess of exports over imports. — b) Excess of imports over exports.

(1) Data up to 31st October. — (2) Data up to 30th September. — (3) Data up to 31st August — (4) See Net Imports. — (5) See Net Exports.

STOCKS

STOCKS AND AVAILABLE SALEABLE SUPPLIES OF CEREALS AND POTATOES IN FARMERS' HANDS
IN GERMANY ON DECEMBER, 15.

PRODUCTS	% Stocks: total production				% Available saleable quantities: total production			
	15-XII-30	15-XI-30	15-XII-29	15-XII-28	15-XII-30	15-XI-30	15-XII-29	15-XII-28
Winter wheat	4.37	52.4	46.9	53.4	35.2	42.6	37.6	43.1
Spring wheat	08.5	74.9	73.4	74.3	53.5	59.8	59.8	63.9
Winter rye	...	63.4	55.1	53.7	28.5	35.1	30.7	29.6
Winter barley	...	34.6	40.3	31.7	3.7	4.9	8.0	3.8
Spring barley	...	00.3	58.7	49.8	27.0	36.4	37.1	30.6
Oats	...	81.4	72.8	70.7	19.7	22.5	26.3	21.6
Potatoes	...	08.7	57.9	62.5	18.0	23.1	16.3	21.2

Authority: *Preisberichtstelle beim Deutschen Landwirtschaftsrat.*

VISIBLE SUPPLY OF CEREALS IN CANADA AND THE UNITED STATES (1).

PRODUCTS AND COUNTRIES	27-XII-30	29-XI-30	1-XI-30	28-XII-29	29-XII-28	27-XII-30	29-XI-30	1-XI-30	28-XII-29	29-XII-28
	1000 centals					1000 bushels				
WHEAT:										
Canada	124,016	118,790	107,206	130,742	118,331	206,693	197,998	178,827	217,903	197,219
United States	110,242	124,487	126,060	114,709	88,088	198,736	207,479	211,690	191,182	146,813
TOTAL	243,258	243,286	234,256	245,451	206,419	405,429	405,477	390,427	409,085	344,032
RYE:										
United States	9,010	9,505	9,360	7,318	3,560	16,089	16,973	16,714	13,068	6,367
OATS:										
Canada	4,756	4,408	3,625	6,988	5,690	14,864	13,776	11,328	21,839	17,808
United States (2)	9,796	9,805	10,723	9,380	5,478	30,611	30,641	33,509	29,314	17,118
TOTAL	14,552	14,213	14,348	16,368	11,177	45,475	44,417	44,837	51,153	34,926
BARLEY:										
Canada	11,735	12,603	14,568	12,955	9,386	30,697	26,256	30,413	29,073	19,554
United States (2)	5,598	5,090	5,777	4,765	4,410	11,662	11,854	12,035	9,927	9,250
TOTAL	20,333	18,293	20,375	18,720	13,820	42,359	38,110	42,448	39,000	28,804
MAIZE:										
United States (2)	7,487	4,150	2,634	4,743	9,962	13,369	7,411	4,703	8,469	17,790

Authority: *Bradstreet's* (for rye: *Grain, Seed and Oil Reporter*).

(1) Grain stored at principal interior and seaboard points of accumulation and grain in transit by canals and lakes. — (2) East of Rocky Mountains.

GRAIN AND FLOUR STOCKS AT THE PORTS OF GREAT BRITAIN AND IRELAND (1).

PRODUCTS	1-I-31	1-XII-30	1-XI-30	1-I-30	1-I-29	1-I-31	1-XII-30	1-XI-30	1-I-30	1-I-29
	1000 centals					1000 bushels				
WHEAT:										
Grain	12,792	7,464	5,064	9,230	3,096	21,320	12,440	8,440	15,384	5,160
Flour as grain	980	888	912	874	624	1,600	1,480	1,520	1,456	1,040
TOTAL	13,752	8,352	5,976	10,104	3,720	22,920	13,920	9,960	16,840	6,200
Maize	2,064	2,280	2,304	3,504	2,112	3,686	4,071	4,114	6,257	3,771
Barley	1,880	1,460	1,020	1,500	1,740	3,917	3,042	2,125	3,250	3,625
Oats	1,008	1,376	1,056	720	538	3,150	4,300	3,300	2,250	1,680

Authority: *Broomhall's Corn Trade News.*

(1) Imported cereals.

STOCKS OF COTTON ON HAND IN THE UNITED STATES.

LOCATION	31-XII-30	30-XI-30	31-X-30	31-XII-29	31-XII-28	31-XII-30	30-XI-30	31-X-30	31-XII-29	31-XII-28
	1000 centals					1000 bales (counting round as half bales)				
In consuming establishments	8,083	7,629	6,581	8,024	8,428	1,660	1,567	1,352	1,844	1,741
In public storage and at compresses	40,834	40,930	36,761	28,643	25,743	8,377	8,397	7,542	5,915	5,316
TOTAL	48,917	48,559	43,342	37,567	34,171	10,037	9,964	8,894	7,759	7,057

STOCKS OF COTTON AT BOMBAY AND AT ALEXANDRIA.

PORTS	31-XII-30	27-XI-30	30-X-30	2-I-30	3-I-29	31-XII-30	27-XI-30	30-X-30	2-I-30	3-I-29
	1000 centals					1000 bales (1 bale = 478 lbs.)				
Bombay (1)	2,548	1,597	1,066	3,864	3,508	533	334	348	808	734
Alexandria	5,214	4,829	4,280	3,223	3,559	1,091	1,010	897	674	745

Authorities: *East Indian Cotton Ass.* and *Alexandria General Produce Ass.*

(1) Stocks held by exporters, dealers and mills.

STOCKS OF COTTON IN EUROPE.

COUNTRIES, PORTS, DESCRIPTIONS	31-XII-30	27-XI-30	30-X-30	2-I-30	3-I-29	31-XII-30	27-XI-30	30-X-30	2-I-30	3-I-29
	1000 centals					1000 bales (1 bale = 478 lbs.)				
<i>Great Britain</i> (1):										
American	2,651	1,925	1,443	2,146	3,075	555	403	302	449	614
Argentine, Brazilian, etc.	210	221	254	464	183	44	46	53	97	38
Peruvian, etc.	426	429	442	391	297	89	90	92	82	62
East Indian, etc.	288	166	229	177	177	60	35	48	37	37
Egyptian, Sudanese	1,432	1,297	1,229	1,047	722	299	271	257	219	151
Other (2)	233	233	251	280	223	49	49	53	50	47
TOTAL	5,240	4,271	3,848	4,505	4,679	1,066	894	805	943	979
<i>Bremen</i> :										
American	2,670	2,223	1,865	2,525	3,380	560	465	390	528	700
Other	72	42	34	16	16	15	9	7	3	3
TOTAL	2,751	2,265	1,899	2,541	3,405	575	474	397	531	712
<i>Le Havre</i> :										
American	1,478	1,074	883	1,076	1,084	309	225	185	225	227
Other	168	126	186	134	48	35	26	39	28	10
TOTAL	1,646	1,200	1,069	1,210	1,132	344	251	224	253	237
<i>Total Continent</i> (3):										
American	4,838	3,532	3,704	4,265	4,974	1,012	739	643	892	1,041
Argentine, Brazilian, etc.	154	136	108	50	32	32	29	23	12	7
E. Indian, Australian, etc.	213	182	222	108	137	45	38	46	23	20
Egyptian	121	96	79	65	64	25	20	17	14	13
W. Indian, W. African, E. African, etc.	80	82	120	101	44	17	17	25	21	9
TOTAL	5,406	4,028	3,603	4,598	5,251	1,131	843	754	962	1,090

Authority: *Liverpool Cotton Ass.*

(1) Data for following day. (2) Includes: W. Indian, etc.; E. African, etc.; W. African, and Australian. (3) Includes Bremen, Havre, and other Continental ports.

MONTHLY REVIEW OF PRICES (1)

PRODUCTS, MARKETS AND DESCRIPTIONS	Jan. 16, 1931	Jan. 9, 1931	Jan. 2, 1931	Dec. 26, 1930	Dec. 19, 1930	Average (2)			Commercial Season	
						Dec. 1930	Jan. 1931	Jan. 1931	1929-30	1928-29
WHEAT.										
Winnipeg: No. 1 Manitoba (cents p. 60 lbs.)	53 1/2	53 1/4	53 3/4	50 3/8	53 3/4	55 1/8	129 1/2	120 3/4	124 3/4	124
Chicago: No. 2 Hard Winter (4) (cents p. 60 lbs.)	80 1/4	79 1/4	78 3/4	78 1/2	78 1/2	78 3/4	122 1/4	120 3/4	114 3/4	119 1/4
Minneapolis: No. 1 Northern (cents p. 60 lbs.)	77	76	75	75	77 1/4	77 1/2	126 3/4	115	117 1/2	115 1/4
New York: No. 2 Hard Winter (4) (cents p. 60 lbs.)	n. q.	n. q.	n. q.	n. q.	n. 85	90 1/4	130 3/4	134 3/4	121 3/4	131 1/2
Buenos Aires (a); Barlette (80 kg. p. hectol. — pesos paper per quintal)	6.25	6.35 (4)	6.15 (5)	6.20	6.40	6.40	11.33	9.86	10.65	9.93
Karachi: Karachi white, 1 1/2 % barley, 1 1/2 % dirt (rupees per 656 lbs.)	20-12-0	21-2-0	18-8-0	17-12-0	17-4-0	17-5-6	39-14-0	47-5-6	36-6-9	43-13-7
Berlin: Home grown (Reichsmarks p. quintal)	25.50	25.70	25.30 (6)	24.90	24.70	24.70	24.50	20.90	25.33	21.83
Hamburg, c. i. f. (Reichsmarks p. quintal):										
No. 3 Manitoba	...	(7) 11.49	(7) 10.90	(7) 10.98	(7) 11.49	(7) 11.73	22.66	22.05	21.30	21.50
No. 2 Hardwinter	...	n. q.	n. q.	n. q.	n. q.	n. q.	21.25	21.64	19.49	20.98
Barusso (79 kg. p. hectol.)	...	9.80	9.80 (5)	9.29 (8)	10.14 (8)	10.44	20.61	20.13	18.72	19.96
Antwerp (Belgian francs p. quintal):										
Home grown	83	88	86	85	83	81 3/4	153	159 1/2	154 1/2	162 1/2
No. 2 Hard Winter, Gulf	110	96	99	103	108	105 1/2	185	...	171	...
Paris: Home grown, 75-77 kg. (francs p. quintal)	174.25	173.50	169.25 (5)	173.00	167.00	167.12	137.00	154.44	139.42	155.35
London: Home grown (shillings per 504 lbs.)	23/6	23/9	24/3	n. q.	26/9	28/5	42/6	42/9	40/10	43/6
London and Liverpool c. i. f., shipping current month (shillings p. 480 lbs.):										
South Russian (on sample)	19/-	19/6	19/9	(5) 20/9	21/9	21/7	n. q.	n. q.	n. q.	n. q.
No. 3 Manitoba	(7) 23/-	(7) 23/8	(7) 22/3	(5) 23/-	23/4 1/2	24/1	48/3	46/4	45/2	45/6
No. 2 Hard Winter	n. q.	n. q.	n. q.	n. q.	n. q.	n. q.	45/2	n. q.	41/5	43/3
White Pacific	26/6	26/6	27/3	(5) 26/6	26/6	27/-	45/11	46/5	42/3	46/-
Rosale (63 1/2 lbs.), afloat	(9) 20/-	(9) 20/3	(9) 20/3	(5) 20/6	(9) 22/3	22/1	43/10	42/4	40/3	42/3
Choice White Karachi	n. q.	n. q.	n. q.	n. q.	24/9	25/1	n. q.	n. q.	42/2	n. q.
Australian	23/3	23/9	24/-	(5) 25/6	26/-	26/7	40/9	46/4	43/6	45/11
Milan (b): Home grown, soft (liras p. quintal)	105.00	103.50	101.50	101.50	102.50	103.00	136.00	134.75	131.31	131.38
Genoa c. i. f. (shillings p. metric ton): La Plata.	n. 94/-	n. 94/-	n. 94/-	n. q.	n. 104/-	n. 110/-	203/7	197/4	184/6	192/10
RYE.										
Minneapolis: No. 2 (cents per 56 lbs.)	39 1/2	38 1/2	39	38	43 1/2	44 1/2	88 3/4	104	80 3/4	90
Berlin: Home grown (Reichsmarks per quintal)	15.25	15.50	15.70 (5)	15.70	15.10	15.40	16.08	20.56	17.04	20.47
Hamburg c. i. f.: La Plata, 74-75 kg. (R. M. p. 100 kg.)	...	n. q.	(10) 7.60 (9) 7.35	(10) 7.55	n. 7.45	n. q.	20.21	14.57	19.72	...
Groningen (c): Home grown (florins per quintal)	...	4.40	4.40	4.40	4.05	4.67	6.47	9.66	6.33	9.74
BARLEY.										
Winnipeg: No. 4 Western (cents p. 48 lbs.)	20 1/4	20 3/4	20 3/4	21 1/4	22 1/4	22 3/4	50 7/8	68 3/4	51 7/8	67 3/4
Chicago: Feeding (cents per 48 lbs.)	41	41	42	41	45	46 1/2	61 1/4	50	57 3/4	56 7/8
Berlin: Home grown, fodder (Reichsmarks per quintal)	19.10	19.10	19.10 (5)	19.10	19.10	19.16	16.09	10.62	17.40	19.73
Antwerp: Danube (francs per quintal)	67	67	67	67	70	68	115	154 1/2	107 1/2	154 1/2
London: English malting (shillings p. 448 pounds)	37/-	37/-	36/-	n. q.	38/-	11) 37/10	41/8	51/4	39/-	47/8
London and Liverpool, c. i. f., parcels (shillings per 400 lbs.):										
Danubian 3 %	n. q.	n. q.	14/4 1/2	5) 13/-	14/4 1/2	11/3	22/1	32/6	22/3	32/6
Russian (Azoof-Black sea)	13/-	n. q.	12/6	n. q.	13/6	13/9	22/2	n. q.	18/11	n. q.
Canadian Western, No. 4	(12) 15/3	(12) 15/9	(12) 15/9	5) 15/15	(12) 15/3	12) 15/9	25/5	32/7	n. 25/10	29/4
Californian malting (shillings p. 448 lbs.)	26/6	26/-	25/6	(5) 25/6	25/6	25/6	33/-	43/6	32/6	39/9
Moroccan	n. q.	n. q.	n. q.	n. q.	n. q.	n. q.	22/1	31/6	n. 24/2	29/8
Groningen (c): Home grown winter (fl. p. quintal)	...	4.75	4.75	4.70	4.80	4.74	8.00	9.82	7.55	9.97

(a) Thursday prices. — (b) Saturday prices. — (c) Prices of preceding Tuesday.

(1) All quotations are, unless otherwise stated, for spots. — (2) The monthly averages are based on Friday quotations, the annual averages on the monthly. — (3) Quoted formerly as No. 2 Winter. — (4) Price of December, 27. — (5) Price of December, 24. — (6) Price of December, 27. — (7) No. 2 Manitoba. — (8) 78 kg. per hectolitre. — (9) Shipping January-February. — (10) 72-73 kg. per hectolitre. — (11) December 12: 38/- — (12) No. 3 Western.

PRODUCTS, MARKETS AND DESCRIPTION	Jan. 16, 1931	Jan. 9, 1931	Jan. 2, 1931	Dec. 26, 1930	Dec. 19, 1930	Average (1)							
	Dec. 1930	Jan. 1930	Jan. 1929	Commercial Season									
	1930	1930	1929										
OATS.													
Winnipeg: No. 2 White (cents per 34 lbs.) . . .	37 1/8	26 1/2	25	25 1/8	27 1/8	28 1/8	58 1/8	67 1/2	58 1/2	58 1/8			
Chicago: No. 2 White (cents per 32 lbs.) . . .	33	34	32	32 1/4	33 1/4	34 1/8	45 1/8	53	44 1/8	47 1/4			
Buenos Aires (a): Current quality (pesos paper per quintal)	3.15	3.10	(2) 3.00	(3) 3.00	3.05	3.17	5.05	7.61	5.30	7.71			
Berlin: Home grown (Reichsmarks per quintal) .	14.05	14.15	14.30	(3) 14.30	14.30	14.26	14.09	20.14	15.62	19.98			
Paris: Home grown, black and other (francs per quintal)	75.75	76.25	73.00	(3) 75.00	74.00	73.69	76.15	127.30	81.13	127.84			
London: Home grown white (shillings per 336 lbs.)	17/6	17/6	16/6	n. q.	17/-	17/6	22/-	28/9	21/-	28/5			
London and Liverpool c. i. f., parcels (shillings p. 320 lbs.):													
Danubian (39-40 lbs.)	n. q.	n. q.	n. q.	n. q.	n. q.	n. 11/1	5/16/6/8	n. q.	(5)n. 16/4	n. q.			
Plate (f. a. q.)	9/-	9/4 1/2	9/3	(3) (6) 9/6	(6) 9/9	10/1	15/8	23/11	16/1	23/9			
White clipped American	n. q.	n. q.	n. q.	n. q.	n. q.	n. q.	n. q.	25/4	n. q.	24/2			
Chilian Tawny	n. q.	11/6	n. q.	n. q.	n. q.	n. 12/-	(7) 18/-	n. 25/6	17/3	24/2			
Milan (b): spot (liras per quintal):													
Home grown	73.50	73.50	73.50	73.50	73.50	74.00	86.50	108.12	80.73	103.31			
Foreign imported	54.50	56.00	56.00	55.00	55.00	55.75	75.10	100.50	74.27	98.90			
MAIZE.													
Bralla: Danube (lei per quintal)	209	207	192	n. q.	197	214	285	688	309	687			
Chicago: No. 2 Mixed American (cents per 56 lbs.)	67 1/4	70 1/4	65 1/4	63	68 1/4	70 1/8	85 1/4	93 1/2	85 1/2	91 1/4			
Buenos Aires (a): Yellow Plate (pesos paper per quintal)	3.80	3.85	(2) 3.75	(3) 3.75	3.90	3.95	6.35	9.12	6.17	8.35			
Antwerp, spot (Belgian francs per quintal):													
Bessarabian	65	65	67	70	74	73	n. q.	170	n. 97 1/4	n. q.			
Yellow Plate	64	64	66	69	74	73	115	166	109 1/4	155 1/4			
London and Liverpool, parcels, c. i. f. (shillings per 480 lbs.):													
Danube	n. q.	n. q.	n. q.	n. q.	(7) 18/-	n. 18/11	27/5	n. q.	24/11	n. q.			
Yellow Plate	14/3	15/3	15/3	15/10 1/2	15/10 1/2	16/10	26/4	41/6	25/3	38/3			
No. 2 White African	n. q.	n. q.	n. q.	n. q.	n. q.	n. q.	28/8	41/1 1/2	26/-	38/8			
Milan (b): Home grown (liras per quintal) . . .	48.50	48.50	48.50	48.50	49.50	50.25	77.00	105.50	71.34	97.90			
RICE (CLEANED).													
									1930	1929			
Milan (b): Maratelli (lire per quintal)	110.00	103.50	105.00	105.00	105.00	111.00	178.50	195.75	152.15	165.68			
Rangoon: No. 2 Burma (rupees per 7500 lbs.) .	265	290	255	255	260	280	414 1/2	458	393 1/4	462 1/4			
Saigon (Indochinese piastres p. quintal):													
No. 1 Round white (25 % broken) . . . . .	...	...	...	...	...	...	11.96	10.19	...	11.58	
No. 2 Japan (40 % broken) . . . . .	...	...	...	...	...	...	11.56	9.72	...	11.08	
London (a): c. i. f. (shillings per 112 lbs.):													
Spanish Belloch No. 3 oil	10/10 1/2	11/1 1/2	n. q.	n. q.	12/-	12/4	15/9	20/8	14/1	17/11			
Italian good No. 6 oil	11/9	11/-	n. q.	n. q.	11/6	12/3	17/1	20/-	14/11	18/9			
American Blue Rose	18/-	18/-	n. q.	n. q.	18/3	18/3	21/5	21/4	21/9	21/10			
Burma, No. 2	8/-	8 1/2	n. q.	n. q.	8 1/2	8 2/5	11/11	13/2	10/11	13/2			
Saigon, No. 1	7/10 1/2	8/-	n. q.	n. q.	(6) 9/-	(6) 9/-	12/-	13/4	11/6	13/3			
Siam, Garden, No. 1	10/7 1/2	10/-	n. q.	n. q.	9/9	10/-	14/2	15/6	14/-	15/1			
Tokio: Various qualities (yens per koku) . . . .	...	17.60	...	17.70	17.40	18.00	27.00	28.20	25.57	29.06		
LINSEED.													
Buenos Aires (a): Current quality (pesos paper per quintal)	10.00	10.35	(2) 10.10	(3) 10.30	11.00	11.45	19.07	15.16	17.19	18.20			
Antwerp: Plate (Belgian francs p. quintal) . . .	162	163	175	181	201	200	344	280	284 1/4	318 1/4			
Hull, c. i. f.: Plate (p. sterling p. l. ton) . . .	8-7-6	8-8-9	8-7-6	8-8-9	(6) 9-0-0	(6) 9-7-2	18-1-9	15-12-6	15-0-5	18-5-0			
London, c. i. f.: Bombay bold (p. st. per long ton).	12-7-6	12-1-3	n. 11-15-0	(3) 12-7-6	13-0-0	13-0-7	21-7-0	19-3-5	17-14-4	20-16-1			
Duluth: No. 1, Northern (cents p. 56 lbs.) . . .	(8) 160	(8) 161 1/2	(8) 158 1/4	(4) 160 1/4	155 1/2	159 1/4	307	240 7/8	286	273 1/4			

(a) Thursday prices. — (b) Saturday prices.

(1) The monthly averages are based on Friday quotations, the annual averages on the monthly. — (2) Price of December, 31. — (3) Price of December, 24. — (4) Price of December, 27. — (5) Weight not indicated. — (6) New harvest. — (7) March-April delivery. — (8) May delivery.

PRODUCTS, MARKETS AND DESCRIPTION	Jan. 16, 1931	Jan. 9, 1931	Jan. 2, 1931	Dec. 26, 1930	Dec. 19, 1930	Average (1)			
						Dec. 1930	Jan. 1930	Jan. 1929	Commercial Season
									1929-30 1928-29
COTTONSEED.									
Alexandria : Sakellariadis (piastres per ardeh)	52.5	52.6	50.7 (2) 51.0	52.0	53.0	75.0	101.0	67.9	95.4
Hull : Sakellariadis (p. sterl. p. long ton)	5-15-0	5-17-0	5-10-0 (2) 5-8-9	5-12-6	5-14-4	7-9-0	10-6-7	6-18-2	9-12-2
COTTON.									
New Orleans : Middling (cents per lb.)	9.73	9.80	9.69	9.40	9.44	9.00	16.76	19.12	16.17 18.88
New York : Middling (cents per lb.)	10.15	10.20	10.15	9.80	9.75	9.96	17.15	20.19	16.60 19.69
Bombay : M. g. Broach f. g. (rupees per 784 lbs.)	181	175 ½	174	177	173	177 ¼	299	357 ½	283 ½ 346 ½
Alexandria (a) (talaris per kantar) :									
Sakellariadis f. g. f.	14	13 ¾ (3) 13 ½ (2) 13 ¾	14 ½	14 ¾	14 ¾	26 7/8	37 ½	28 ½	35 ¼
Achmouni (Upper Egypt) f. g. f.	10 ¾	10 7/8 (3) 10 ¾ (2) 10 ¾	10 ¾	10 ¾	10 ¾	19 7/8	22 ¾	19 ¾	22 7/8
Bremen : Middling (U. S. cents per lb.)	11.14	11.17	10.91 (2) 10.86	10.92	11.13	18.72	21.37	18.27	21.19
M. g. Broach fully good (pence per lb.)	n. 4.65 n.	4.55 n.	4.50 (2) 4.45 n.	4.45 n.	4.47 n.	7.36 n.	8.56 n.	6.83 n.	8.27
Le Havre : Middling, Gulf (francs pr 50 kilogr.)	338	330	332	332	327	335	508	633	545 624
Liverpool (pence per lb.) :									
Middling fair	n. 6.61 n.	6.60 n.	6.53 (2) 6.51 n.	6.52 n.	6.63 n.	10.67 n.	11.78 n.	10.39 n.	11.69
Middling	5.41	5.40	5.33 (2) 5.31	5.32	5.44	9.37	10.55	9.09	10.53
São Paulo good fair	5.71	5.70	5.63 (2) 5.61	5.62	5.73	9.54	11.10	9.02 n.	10.91
M. g. Broach fully good	n. 0.46 n.	3.65 n.	3.85 (2) 3.80 n.	3.90 n.	4.00 n.	7.01 n.	8.76 n.	6.80 n.	8.68
Sakellariadis fully good fair	8.20	7.95	7.70 (2) 7.85	7.85	8.07	14.43	19.15	14.52	18.17
BUTTER.									
Copenhagen (A) (Kr. p. 100 kg.)									
Maasricht, auction (b) : Dutch (guldeus p. 50 kg.) . . . . .	...	218	(3) 228 (2) 228	228	223	286	321	245	303
Hamburg, auction (b) : Schleswig Holstein butter with quality mark (R. M. per 50 kg.)	138.37	141.19	147.50 (4) 149.67	149.61	144.01	162.75	189.28	146.67	178.03
Kempten (b) : Allgäu butter (Pfennige p. half kg.)	116	122	122	125	125	122 ½	145	164	128 150
London (c) (shillings p. cwt.) :									
British blended	135/4	135/4	135/4 (5) ...	135/4	135/4	186/8	207/8	158/8	196/-
Danish	142/-	144/-	144/- (5) ...	144/-	140/-	178/5	205/-	153/6	180/0
Irish creamery salted	n. q.	n. q.	n. q. (5) ...	n. q.	n. q.	n. q.	n. 192/-	134/10	179/4
Dutch	142/-	144/-	140/- (5) ...	140/-	141/-	182/10	n. q.	151/11	182/4
Argentine	118/-	118/-	117/- (5) ...	116/	114/1 ½	159/7	160/-	135/10	171/1
Siberian	n. q.	n. q.	n. q. (5) ...	108/-	...	159/7	n. q.	...	167/2
Australian salted	120/-	120/-	119/- (5) ...	118/-	113/7 ½	161/2	190/-	135/9	176/-
New Zealand salted	122/-	122/-	121/- (5) ...	120/-	115/1 ½	163/7	191/-	137/8	178/9
CHEESE.									
Milan (lire per quintal) :									
Parmigiano-Reggiano, 1st quality of last year's production	1,100	1,100	1,100 1,100	1,100	1,100	1,137	1,045	1,160	1,074
Green Gorgonzola, mature, choice	660	660	660 660	660	664	749	850	671	829
Rome : Roman pecorino (lire p. quintal)	1,087	1,087	1,115 1,115	1,115	1,115	1,317	1,611	1,207	1,542
Alkmaar : Edam 40 + 40% butterfat, with the country's cheesemark, factory cheese, small; florins, p. 50 kg.)									
Boecgraven : Gouda 45 + (whole milk cheese, with the country's cheesemark, home made; florins, p. 50 kg.) . . . . .	...	32.50	33.50 n. q.	35.50	36.50	45.60	47.12	40.88	47.10
Kempten (C) : Pfennige per half kg.) :		38.00	38.00 n. 38.00	40.00	40.25	53.20	55.50	45.56	52.45
Soft cheese, green (20 % butterfat)	(6) 28 ½	28 ½	28 ½	28 ½	28 ½	30	31	27	35
Emmenthal from the Allgäu (whole milk cheese)	98 ½	(6) 98 ½	91	91	91	102 ½	104	97	107
London (c) (shillings per cwt.) :									
English Cheddar	95/-	95/-	95/- (5) ...	96/-	95/10 ½	110/10	140/6	103/4	121/9
Canadian	82/6	82/6	81/- (5) ...	81/-	81/-	102/5	114/10	93/11	107/8
New Zealand	83/6	85/6	85/- (5) ...	86/-	85/6	90/2	100/7	82/2	95/5
Liverpool (c) : Engl. Cheshire, ungraded (sh. p. cwt.)	95/8	91/-	91/- (5) ...	91/-	91/7	135/4	135/4	96/5	111/9

(a) Thursday prices. — (b) Wednesday prices. — (c) Average prices for weeks ending on preceding Wednesday.

(1) The monthly averages are based on Friday quotations, the annual averages on the monthly. — (2) Price of December, 24. —

(3) Price of December, 31. — (4) Price of December, 22. — (5) Not published. — (6) First quality; average price for all qualities: 91.

QUARTERLY REVIEW OF PRICES (1)

Groups	COUNTRIES AND PRODUCTS	Average						Agricultural year (2)	
		XII	XI	X	VII-IX	X-XII	X-XII	1929-30	1928-29
		1930	1930	1930	1930	1929	1928		
GERMANY (Prices in Reichsmarks per quintal).									
A I	Wheat (Berlin)	24.70	24.97	22.74	25.95	23.50	20.08	25.00	21.80
	Rye (Berlin)	15.49	15.20	14.77	17.07	17.29	20.44	17.27	21.00
	Barley, feeding (Berlin)	19.16	17.55	17.25	18.59	17.50	20.34	17.43	19.97
	Oats (Berlin)	14.28	14.40	14.90	17.54	16.21	20.06	15.77	20.51
	Potatoes (Berlin)	2.60	2.62	2.76	n. 2.95	2.39	5.06	3.63	5.14
A II	Milk, fresh (Berlin)	17.20	17.85	18.00	(3) 17.44	19.14	20.36	16.89	18.49
	Butter (Hamburg)	288.02	285.06	296.60	294.24	378.76	390.02	330.08	363.62
	Cheese, Emmental variety (Kempten)	182	182	182	192	203	355	205	221
	Beef (Berlin) (4)	113.60	111.00	110.20	118.53	114.10	106.80	114.84	114.20
	Veal (Berlin) (4)	130.80	145.60	153.60	141.00	152.60	144.14	143.02	137.60
	Pork (Berlin) (4)	116.80	127.80	118.60	126.10	163.60	149.20	154.09	148.20
B I	Basic slag (Aachen) (5)	0.32	0.32	0.32	0.31	0.32	0.29	0.31	0.30
	Superphosphate of lime 18 % . . . . .	..	6.48	6.48	6.44	6.35	5.99	6.51	6.16
	Potash salts 18-22 % (5)	0.152	0.152	0.152	0.152	0.152	0.152	0.152	0.152
	Sulphate of Ammonia (5)	0.84	0.82	0.81	0.78	0.84	0.80	0.86	0.92
	Nitrate of lime (B. A. S. F.) (5)	1.00	0.98	0.98	0.96	1.04	1.13	1.05	1.13
B II	Wheat bran (Hamburg)	9.70	8.02	6.70	7.74	9.82	14.30	9.33	13.66
	Linseed cake (Hamburg)	16.04	15.10	15.02	16.88	23.92	24.74	21.08	23.80
	Coconut cake (Hamburg)	12.88	12.34	12.88	14.05	18.50	22.10	16.94	21.16
	Rapeseed cake (Hamburg)	9.04	8.16	8.50	10.01	17.88	19.66	15.59	19.36
	Groundnut cake (Hamburg)	12.32	11.80	11.36	13.49	20.56	23.56	17.55	22.18
	Crushed soya extraction residue (Hamburg)	13.20	12.64	12.72	14.17	18.50	21.86	16.59	21.22
DENMARK (Prices in Danish crowns per quintal).									
A I	Wheat (Copenhagen)	11.05	10.80	11.50	14.00	16.00	16.16	16.08	16.74
	Rye (Copenhagen)	n. q.	n. q.	n. q.	8.75	13.27	16.61	12.90	16.48
	Barley (Copenhagen)	10.95	10.55	11.20	11.70	14.83	16.33	14.13	16.69
	Oats (Copenhagen)	10.75	10.75	11.00	11.80	12.96	16.30	18.69	17.32
A II	Butter (Copenhagen)	223	224	246	246	317	338	280	311
	Eggs	170	190	168	119	220	208	149	159
	Pork (4)	91	100	99	122	150	140	155	153
B I	Superphosphate 18 %	5.82	5.79	5.75	5.79	6.13	5.95	6.22	5.99
	Potash salts 37 %	12.95	12.65	12.52	12.46	13.00	n. 13.20	13.05	13.44
	Sulphate of ammonia	17.10	16.70	16.85	18.12	18.35	n. q.	18.55	20.10
	Nitrate of lime, Norwegian	16.40	16.10	15.80	16.27	n. q.	n. q.	16.47	16.60
B II	Maize, Plate (Copenhagen)	9.00	9.00	10.30	12.00	14.85	17.15	13.47	17.41
	Wheat bran (Copenhagen)	8.73	8.37	8.27	8.93	12.53	15.09	11.49	15.05
	Cotton seed cake (Copenhagen)	14.70	14.17	14.60	15.75	20.21	22.02	18.96	22.06
	Sunflower seed cake (Copenhagen)	13.57	12.90	12.85	13.30	18.23	21.81	15.95	21.14
	Groundnut cake (Copenhagen)	12.57	12.10	12.22	13.40	20.12	22.29	17.27	21.37
	Crushed soya extraction residue (Copenhagen)	13.07	12.40	12.60	13.56	17.66	20.23	16.00	19.57

(1) Each quarter a list will be published for several countries of prices of products of the soil (A I) and of livestock (A II) sold by the farmer, as well as of fertilisers (B I), and of concentrated feeding stuffs for livestock (B II) bought by the farmer.

In the case where the market is not indicated, the price is the average one for the country. — The prices paid to farmers for sugar beet are generally fixed once for the year and therefore are not inserted in these tables.

(2) July to June. — (3) Live weight. — (4) Prices per unit per quintal.

Groups	COUNTRIES AND PRODUCTS	Average						Agricultural year	
		XII	XI	X	VII-IX	X-XII	X-XII	1929-30	1928-29
		1930	1930	1930	1930	1929	1928		
FRANCE (Prices in francs per quintal).									
A I	Wheat (Paris)	167.12	164.75	168.80	166.83	142.68	154.18	139.70	155.96
	Rye (Paris) (1)	n. q.	n. q.	n. q.	n. q.	n. 92.65	n. 129.00	n. 87.70	n. 130.00
	Barley (Paris) (1)	n. 83.00	n. 84.66	n. q.	n. q.	102.82	133.75	92.59	134.86
	Oats (Paris)	73.69	70.20	78.20	77.44	114.87	121.91	90.22	130.79
	Wine, red (southern markets) (2) . . . . .	...	171	174	140	103	149	89	154
A II	Beef (Paris) (1) (3)	1,074	1,065	1,004	1,123	875	729	916	790
	Pork (Paris) (1) (4)	651	700	733	742	849	748	851	761
	Mutton (Paris) (1) (3)	1,562	1,495	1,507	1,476	1,477	1,245	1,452	1,325
.									
B I	Basic slag, 18 % (Lorraine)	25.20	25.20	25.20	25.20	26.10	22.50	25.06	24.10
	Superphosphate 14 % (North and East)	n. 31.40	31.40	31.40	31.47	31.50	28.67	31.61	29.15
	Sylvinit, minimum 12 %	10.60	10.60	10.60	10.60	10.95	10.95	10.89	10.95
	Nitrate of soda (Dunkirk)	109.00	108.00	107.00	106.73	114.50	123.50	115.71	124.83
	Sulphate of ammonia 20.4 %	n. 112.50	111.50	110.50	111.05	119.25	123.00	118.85	122.81
B II	Lined cake (North) (1)	100	90	101	112	150	140	120	145
	Coconut cake (Marseilles) (1)	67	70	72	75	113	134	102	129
	Groundnut cake (Marseilles) (1)	80	95	97	98	132	154	116	146
.									

GREAT BRITAIN (A: Prices in shillings and pence per cwt;
B: Prices in pounds sterling, etc. per long ton).

A I	Wheat	6/4	6/11	7/2	8/-	9/10	10/-	9/8	10/-
	Barley	5/9	5/9	5/7	6/3	7/11	9/8	7/8	9/10
	Oats	6/-	6/2	6/2	6/3	7/9	9/10	7/6	10/2
	Potatoes (London)	6/-	6/-	5/10	5/3	4/10	6/-	4/-	5/10
A II	Butter (London)	135/4	149/2	149/2	154/-	196/-	206/1	177/4	205/4
	Cheese, Cheddar (London)	95/10	97/6	95/2	93/4	107/10	140/1	109/1	135/10
	Beef (London) (3)	73/10	73/10	77/-	85/7	77/-	71/7	82/10	80/6
	Mutton (London) (3)	105/-	105/-	112/-	115/1	103/10	105/1	109/8	107/4
	Pork (London) (3)	109/8	112/-	116/8	107/9	124/10	97/10	120/2	103/10
B I	Basic slag 14 % (London)	2-3-0	2-3-0	2-3-0	2-3-0	2-3-0	2-0-0	2-3-1	2-5-0
	Superphosphate, 16 % (London)	3-6-0	3-6-0	3-6-0	3-6-0	3-6-0	3-1-10	3-6-0	3-3-0
	Kainit 14 % (London)	3-3-0	3-1-0	3-0-3	2-18-10	3-1-0	2-19-11	3-1-2	3-0-0
	Nitrate of soda, 15 1/2 % (London)	9-15-0	9-12-0	9-9-0	9-12-0	9-14-0	10-3-10	9-18-4	10-9-0
	Sulphate of ammonia 20.6 % (London)	9-5-0	9-3-0	9-1-0	9-10-2	9-14-0	10-4-9	9-18-4	10-9-0
B II	Bran, British (London)	5-10-3	5-0-6	4-5-2	4-9-6	6-9-0	7-16-3	5-13-10	7-10-0
	Bran, middlings, imported (London)	4-13-9	4-10-0	4-13-9	4-16-3	6-4-0	8-1-3	5-12-1	7-15-0
	Linseed cake, English (London)	9-12-0	9-14-0	10-3-10	10-11-2	14-0-0	13-17-7	7-12-10	5-13-10
	Cottonseed cake (London)	4-11-6	4-5-0	4-6-0	4-18-3	7-5-0	8-1-3	6-11-7	7-19-0
	Coconut cake (London)	n. q.	n. q.	n. q.	n. q.	10-13-0	11-5-0	10-8-8	11-2-0
	Palm kernel cake (Liverpool)	5-7-0	5-7-0	5-8-2	5-10-1	9-10-0	9-11-4	8-8-4	9-12-0

ITALY (Prices in lire per quintal).

A I	Wheat, soft (Milan)	103.66	109.62	110.10	125.08	130.75	131.78	131.45	131.18
	Wheat, hard (Palermo)	129	134	134	137	141	142	141	143
	Oats (Milan)	74	76.37	77.70	75.61	85.83	106.80	82.18	104.69
	Maize (Milan)	55.25	52.12	55.40	70.84	82.07	105.35	77.85	105.09
	Rice (Milan)	111.00	122.25	125.80	152.67	185.13	196.80	181.22	187.04
	Hemp, fibre (1)		238	275	330	454	531	461	524
	Olive oil (Milan)	630	630	620	566	610	827	573	816
	Wine, ordinary, 11° to 13° (Bari) (2)	110	120	124	130	139	164	136	155

(1) New series. — (2) Price per hectolitre. — (3) Dead weight. — (4) Live weight.

Groups	COUNTRIES AND PRODUCTS	Average						Agricultural year	
		XII	XI	X	VII-IX	X-XII	X-XII	1929-30	1928-29
		1930	1930	1930	1930	1929	1928		
ITALY (continued)									
A II	Cheese Reggiano (Milan)	1,100	1,100	1,100	1,227	1,137	1,279	1,128	1,136
	Eggs, fresh (Milan) (1)	7.21	8.44	7.54	5.82	8.85	9.23	6.26	7.46
	Beef (Milan) (2)	430	426	445	447	492	479	480	478
	Pork (Milan) (2)	482	474	515	515	604	737	637	722
B I	Basic slag 16-20 % (Chiasso) (3)	1.37	1.37	1.37	1.37	1.50	1.42	1.43	1.46
	Superphosphate, mineral, 15-17 % (Genoa) (3)	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30
	Chloride of potassium (Genoa)	80.50	80.50	80.50	81.37	83.75	83.00	83.52	83.00
	Sulphate of ammonia (Genoa)	83.75	89.00	87.50	87.70	89.06	95.19	91.27	95.76
	Copper sulphate (Genoa)	187	187	188	201	225	n. 230	223	228
B II	Wheat bran (Genoa)	41	44	50	54	65	74	58	72
	Rice bran (Milan)	38	33	37	38	60	77	57	72
	Linseed cake (Milan)	62	64	71	77	109	108	99	105
	Groundnut cake (Milan)	50	54	60	64	92	98	82	96
	Rapeseed cake (Milan)	35	36	36	40	71	71	66	74
NETHERLANDS (Prices in guilders per quintal).									
A I	Wheat (Groningen)	6.45	5.87	6.45	9.11	9.60	10.02	9.60	10.50
	Rye (Groningen)	4.67	4.31	4.52	5.02	7.43	9.84	6.72	10.00
	Barley (Groningen)	4.74	4.39	4.64	5.48	8.89	9.08	7.93	10.25
	Oats (Groningen)	5.38	4.82	5.49	5.79	6.69	9.20	6.16	9.75
	Peas (Rotterdam) . . . . .	...	...	...	11.00	13.72	19.42	12.02	15.31
	Flax fibre (Rotterdam) . . . . .	...	...	...	n. 80	109	130	100	125
	Potatoes (Amsterdam) (4) . . . . .	...	...	...	4.38	2.52	3.46	2.64	3.50
A II	Butter (Maastricht)	158	163	167	169	223	233	194	212
	Cheese, Gouda 45 % (Bodegraven)	80.50	91.50	93.80	92.93	115.13	117.20	100.84	106.94
	Cheese, Edam 40 % (Alkmaar)	73.00	79.50	80.40	82.50	102.76	110.74	90.99	95.56
	Eggs (Roermond) (5) . . . . .	...	...	...	5.67	9.87	10.16	7.22	8.12
	Beef (Rotterdam) (6) . . . . .	...	...	...	108	106	98	105	100
	Pork (Rotterdam) (2) . . . . .	...	...	...	64	83	74	79	77
B I	Basic slag (3)	0.152	0.154	0.152	0.149	0.169	0.159	0.162	0.150
	Superphosphate 17 %	2.76	2.80	2.80	2.84	3.29	2.91	3.15	3.04
	Kainite (3) . . . . .	...	...	...	0.151	0.151	0.049	0.150	0.148
	Nitrate of soda	n. 10.40	10.40	10.40	10.40	10.28	11.44	10.50	11.62
	Sulphate of ammonia 20 1/2 %	n. 9.75	n. 9.75	9.75	n. 9.53	10.30	10.81	10.05	11.03
B II	Maize . . . . .	...	...	...	7.16	8.77	11.18	8.54	11.00
	Linseed cake, Dutch	9.25	8.45	8.00	9.95	13.81	14.10	12.24	13.90
	Coconut cake	7.40	7.05	7.75	8.75	10.86	13.08	10.05	12.47
	Groundnut cake	7.10	6.75	7.40	8.65	12.88	n. 14.25	10.95	13.58
POLAND (Prices in zlotys per quintal).									
A I	Wheat (Warsaw)	27.62	27.05	28.28	38.29	30.49	45.79	40.89	48.45
	Rye (Warsaw)	19.18	18.96	18.90	19.29	24.82	35.87	22.72	36.29
	Barley (Warsaw)	25.34	24.77	25.76	26.13	28.08	36.34	26.88	38.03
	Oats (Warsaw)	23.07	21.70	21.25	22.53	24.24	35.74	21.95	37.21
A II	Butter (Warsaw)	555	560	462	470	673	823	590	692
	Beef (Warsaw) (2)	110	114	115	116	137	147	131	147
	Pork (Warsaw) (2)	160	167	175	187	249	220	238	225
	Eggs (Warsaw) (7)	302	305	270	179	303	305	235	279
B I	Superphosphate (3) . . . . .	...	0.84	0.84	0.84	0.90	0.87	0.89	0.88
	Potash salts 25 % . . . . .	...	13.75	13.75	13.75	13.75	10.92	13.75	11.33
	Sulphate of ammonia . . . . .	...	25.00	25.00	25.00	25.00	28.00	25.00	25.50
B II	Wheat bran (Warsaw)	14.50	13.50	13.50	15.50	17.48	27.00	16.04	26.96
	Rye bran (Warsaw)	11.50	11.00	10.30	11.35	14.38	26.30	13.34	25.55
	Linseed cake (Warsaw)	30.00	28.50	30.30	n. 35.00	44.85	50.80	39.86	50.02
	Rapeseed cake (Warsaw)	20.50	20.50	20.00	n. 22.50	33.48	42.65	29.85	40.22

(1) Dozen. — (2) Live weight. — (3) Prices for unit per quintal. — (4) Hectolitre. — (5) 100 eggs. — (6) Dead weight. — (7) Box of 1440 eggs.

Groups	COUNTRIES AND PRODUCTS	Average						Agricultural year	
		XII	XI	X	VII-IX	X-XII	X-XII	1929-30	1928-29
		1930	1930	1930	1930	1929	1928		
SWEDEN (Prices in Swedish crowns per quintal)									
A I	Wheat	19.35	18.95	18.55	18.57	18.27	18.70	18.31	19.24
	Rye	16.35	15.05	15.55	15.51	15.36	19.30	14.92	19.35
	Barley	11.20	11.45	12.15	12.22	13.33	16.59	13.40	16.61
	Oats	8.80	8.90	9.40	9.31	11.22	14.03	10.88	15.25
A II	Beef (Göteborg) (1)	55	56	56	57	56	59	56	54
	Pork (Göteborg) (1)	64	70	71	84	112	99	108	106
	Butter (Malmö)	213	208	220	233	297	315	292	292
	Eggs (Stockholm)	215	252	230	159	204	214	151	155
B I	Superphosphate, 20 %	6.85	7.80	7.80	7.80	n. 7.00	n. 8.05	7.85	7.98
	Potash salts, 20 %	n. 7.95	7.95	7.70	8.10	n. 8.40	n. 8.85	8.25	8.05
	Chilisaftpeter	n. 18.24	18.24	18.03	19.04	n. q.	n. q.	19.38	20.25
	Calcium cyanamide	n. q.	n. q.	n. q.	18.10	n. q.	n. q.	18.40	19.70
	Maize: La Plata	9.80	9.60	10.85	12.42	15.64	17.97	14.73	18.39
B II	Wheat bran	9.00	8.45	8.50	9.20	11.70	14.65	11.12	14.82
	Groundnut cake	13.10	12.95	13.50	14.11	20.89	22.76	18.42	22.30
	Cottonseed cake	12.70	12.15	12.55	13.74	18.61	21.36	16.98	20.49
	Soya meal	13.75	13.30	13.80	14.48	19.13	21.21	17.37	21.14
CZECHOSLOVAKIA (Prices in Czech. crowns per quintal).									
A I	Wheat	141	130	128	161	170	187	172	191
	Rye	99	80	84	93	127	179	121	178
	Barley	121	120	120	124	143	176	138	175
	Oats	98	103	100	107	119	172	117	172
	Edible potatoes	28	32	24	62	27	46	37	56
	Hops	920	1,122	1,020	1,287	1,302	3,842	1,496	8,401
A II	Butter	2,000	2,050	2,050	2,217	2,183	2,742	2,150	2,473
	Fresh eggs (2)	1,457	1,344	1,248	924	1,371	1,369	1,125	1,305
	Beef (3)	1,060	1,075	1,005	942	1,287	1,067	1,156	1,050
	Veal (3)	1,000	1,225	950	967	1,300	1,025	1,219	1,012
	Pork (1)	950	1,110	1,200	1,200	1,470	1,233	1,445	1,247
B I	Basic slag, 15 % . . . . .	...	...	40.87	40.87	41.90	37.41	40.93	38.31
	Superphosphate, 16 to 18 % . . . . .	...	...	54.40	54.07	58.65	57.80	58.37	59.07
	Kalinite, 14 % . . . . .	...	...	23.90	22.22	23.90	23.90	23.62	23.40
	Chile saltpeter . . . . .	...	...	160.00	163.83	165.00	176.40	169.46	178.36
	Sulphate of ammonia, 20 1/2 % . . . . .	...	...	141.80	143.00	149.33	160.33	149.04	163.29
B II	Maize	70	74	90	100	121	160	120	167
	Wheat bran (Prague)	71	67	69	76	86	132	86	130
	Rye bran (Prague)	64	60	61	68	86	132	83	130
	Crushed soya (Prague)	n. q.	122	134	142	180	194	164	190
	Rapeseed cake (Prague)	88	88	97	114	157	176	147	175
	Linseed cake (Prague)	130	132	145	149	199	202	182	190
	Groundnut cake (Prague)	112	110	n.130	145	189	207	174	202

(1) Live weight. — (2) 1440 eggs. — (3) Dead weight.

IMPORT DUTIES ON CEREALS AND FLOUR, AS RULING IN EUROPE ON JANUARY 1ST, 1931.

I : EXPRESSED IN THE OFFICIAL CURRENCY PER METRIC QUINTAL (1)

COUNTRIES	Official currency	Wheat	Rye	Barley	Oats	Maize	Wheat flour	Rye flour
Albania	gold francs	25.00	15.00	15.00	8.00	20.00	37.50	12.00
Germany	Reichsmarks	(2) 11.25-25.00	15.00 (3)	6.00-18.00-20.00	12.00	(4)	51.50	51.50
Austria (5)	gold crowns	2.00	2.00 (6)	0-2.00	1.50	—	5.00	5.00
Belgium (7)	Belgian francs	—	—	—	6.00	—	4.00	4.00
Bulgaria	paper levass	162	162	135	162	162	324	324
Denmark	—	—	—	—	—	—	—	—
Spain	paper pesetas	(8) 21.00	12.00	12.00	8.00	5.50 (8)	21.00	9.00
Estonia	gold francs	15.00	—	—	—	—	(9) 25.00-32.00	9.00
Irish Free State	—	—	—	—	—	—	—	—
Finland	finmarks	100	125	100	25	—	210 (9)	145-225
France	French francs	80.00	21.00	21.00	30.00 (10)	16.80-24.00 (10)	128.00-160.00-185.00	35.00
Great Britain and Northern Ireland	—	—	—	—	—	—	—	—
Greece (12)	gold drachmas	6.00	5.00	5.00	5.00 (13)	5.00-6.00	10.70 (14)	10.00-12.00
Hungary	gold crowns	6.30	5.80	5.00	4.80	2.00	13.00	12.00
Italy	gold liras	16.50	4.50	4.00	1.15 (13)	1.15-16.50	23.70	6.50
Latvia	lats	(15) 7.00 (15)	—	3.00	3.00	—	(9) (15) 10.00-25.00	(15) (16) 5.00-12.00
Lithuania	litas	30.00	20.00	20.00	20.00	20.00	90.00	45.00
Norway	—	(4)	(4)	(4)	(4)	—	(4)	(4)
Netherlands	—	—	—	—	—	—	—	—
Poland (17)	zlotys	17.50 (18)	0-11.00	11.00	11.00 (19)	0-6.00 (20)	25.50 (20)	16.50
Portugal (21)	gold escudos	(22)	1.20	1.20	1.20	1.50	(22)	2.20
Roumania	paper lei	160	45	40	36	36	400	400
Sweden	crowns	3.70	3.70	3.70	—	—	6.50	6.50
Switzerland	francs	(23) 0.60 (23)	0.60	0.60	0.60	0.50 (23)	4.50 (23)	4.50
Czechoslovakia (24)	Czech crowns	55.00	88.00	70.00	70.00 (25)	6.00-18.00	145.00	145.00
Turkey	Turk. pap. pounds	6.30	4.50	4.00	4.00	4.50	9.50	6.00
Yugoslavia	gold dinars	5.00	5.00	3.00	3.00	2.50	8.00	8.00

(1) The duties indicated below are those ordinarily applied. Reductions to gold francs have been made on the basis of the current quotation. All known modifications will be regularly given in subsequent numbers of the Monthly Crop Report and Agricultural Statistics. — (2) General duty R. M. 25.00 (162.43 \$c. per bushel); hard wheat, imported under customs control for the manufacture of groats R. M. 11.25 (73.10 \$c.). — (3) Barley for stock-feeding, imported under customs control, R. M. 18.00 (93.56 \$c. per bushel); in case of controlled produce of marked rye and of potato flakes R. M. 6.00 (31.17 \$c.); all other barley R. M. 20.00 (103.98 \$c.). — (4) Imported exclusively by the Monopoly. — (5) In addition, tax of 2 % ad valorem for whole cereals, of 7 % ad valorem for wheat flour and of 5 % ad valorem for rye flour. — (6) Barley for fodder free, other barley 6 gold crowns (3.82 \$c. per bushel). — (7) In addition tax of 1 % ad valorem for wheat, rye, barley, maize, wheat flour and rye flour and of 2 % ad valorem for oats. — (8) Import forbidden until price of wheat is 53 pesetas (152.87 \$c. per bushel) on Castilian markets. — (9) For bolted and unbolted flour respectively. — (10) Yellow, small-grained maize of Bessarabian type for stock-feeding, fr. 16.80 (76.81 \$c. per bushel); all other maize, fr. 24.00 (23.97 \$c. per bushel). — (11) For extraction tax of 70 % and over fr. 128.00 (447.91 \$c. per barrel), for extraction tax of between 70 % and 60 % fr. 160.00 (559.76 \$c. per barrel), for extraction tax of 60 % and under frs. 185.00 (647.25 \$c. per barrel). — (12) In addition, accessory duties cor-

IMPORT DUTIES ON CEREALS AND FLOUR, AS RULING IN EUROPE ON JANUARY, 1ST 1931

II: EXPRESSED IN AMERICAN CENTS PAR BUSHEL OR BARREL (1).

COUNTRIES	Wheat (60 lbs.)	Rye (56 lbs.)	Barley (48 lbs.)	Oats (32 lbs.)	Maize (56 lbs.)	Wheat flour (196 lbs.)	Rye flour (196 lbs.)
Albania	131.29	73.52	63.02	22.41	98.03	643.30	205.86
Germany (2)	73.10- 102.43	90.97	(3) 31.17- 93.56-103.98	41.50	(4)	1,093.09	1,093.09
Austria (5)	11.03	10.29	(6) 0-8.82	4.43	—	90.06	90.06
Belgium (7)	—	—	—	2.44	—	9.95	9.95
Bulgaria	32.03	29.90	21.34	17.08	29.90	209.29	209.29
Denmark	—	—	—	—	—	—	—
Spain (8)	60.60	32.30	27.68	12.30	14.80 (8)	197.96	84.74
Estonia	78.77	—	—	—	—	(9) 428.87-548.95	154.39
Irish Free State	—	—	—	—	—	—	—
Finland	68.64	80.64	54.91	9.16	—	470.72 (9)	325.08-504.35
France	85.70	20.98	17.98	17.14 (10)	16.81-23.97 (11)	447.91-559.76- 647.25	122.48
Great Britain and Northern Ireland	—	—	—	—	—	—	—
Greece (12)	31.51	24.51	21.01	14.00 (13)	24.51-29.41	183.55 (14)	171.55-205.86
Hungary	34.77	19.85	22.06	14.12	10.20	234.16	216.15
Italy	86.65	22.06	18.60	3.22 (15)	5.64-80.87	406.57	111.51
Latvia (15)	36.76 (15)	—	12.60	8.40	—	(9) (15) 171.55- 428.87	(15) (16) 85.77- 205.86
Lithuania	81.66	50.78	43.52	29.02	50.78	800.09	400.05
Norway (4)	(4)	(4)	(4)	(4)	—	(4)	(4)
Netherlands	—	—	—	—	—	—	—
Poland (17)	53.51 (18)	0-31.42	26.93	17.95 (19)	0-17.11 (20)	254.75 (20)	164.86
Portugal (21) (22)	(22)	1.37	1.18	0.78	1.72	(22)	8.75
Roumania	25.94	6.81	5.17	3.11	5.44	211.69	211.69
Sweden	27.05 (15)	25.24	21.64	—	—	155.08	155.08
Switzerland (23)	3.15 (23)	2.94	2.52	1.68	2.45 (23)	77.20 (23)	77.20
Czechoslovakia (24)	44.48	66.41	45.29	30.19 (25)	4.51-13.58	383.06	383.06
Turkey	81.40	54.26	41.34	27.56	54.26	400.90	253.20
Yugoslavia	26.26	24.51	12.60	8.40	12.25	137.24	137.24

responding to 75 % of customs duties. — (13) For yellow and white maize respectively. — (14) In bags or barrels, gold drachmas 10.00 (171.55 ¢. per barrel); in boxes, gold drachmas 12.00 (205.86 ¢.). — (15) Import allowed only in conjunction with the purchase of certain quantities of home origin. — (16) Coarse-ground flour, lots 5.00 (85.77 ¢. per barrel); flour bolted at least in part, lots 12.00 (205.86 ¢.). — (17) In addition surtax of 10 % on customs duties. — (18) With special licence import is possible without payment of customs duties. — (19) General tariff duty 6.00 (17.11 ¢. per bushel). Horse-tooth type exempt. — (20) Import forbidden. — (21) Besides accessory duties. — (22) Special legislation. — (23) Besides, in case of uncontrolled import, supplementary duties of fr. 20.00 (205.03 ¢. per bushel of wheat, 98.03 ¢. per bushel of rye, and 343.09 ¢. per barrel of flour). — (24) In addition, tax on business of crowns 2.50 for wheat and barley, crowns 2.30 for rye, crowns 1.80 for oats, crowns 1.50 for maize and crowns 8.00 for flour (2.00 ¢., 1.60 ¢., 1.67 ¢., 0.78 ¢., 1.13 ¢., and 21.10 ¢. respectively per bushel or barrel). — (25) Maize for fodder crowns 6.00 (4.51 ¢. per bushel), all other maize crowns 18.00 (13.58 ¢. per bushel).

For latest modifications, see last page.

THE PRICES OF AGRICULTURAL PRODUCTS DURING THE LAST QUARTER OF 1930

In the following pages the index-numbers of prices of agricultural products and other price indices of interest to the farmer are given as published in the different countries. The indices collected together have been obtained according to different methods and criteria in the various countries. A detailed account of the items included in each series and the system of construction of the index-numbers may be found in the volume published especially for this purpose by the Institute, entitled "Index-numbers of prices of agricultural products and other price indices of interest to the farmer". We refer the reader to this volume for an exact interpretation of the significance of the different series of data.

Owing to the substantial divergence which often exists in the value and significance of the indices available, much care is advisable in their utilization from an international point of view. For this reason it has been considered opportune to reproduce all the data in their original form only, without attempting to formally unite them. The latter process, by a comparison of often heterogeneous data, might easily lead to the drawing of erroneous relations and conclusions.

In any case, now that most of the index-numbers for December are available, a table follows, corresponding to that published in the Bulletins for July and October of last year and containing the quarterly indices.

General index-numbers of prices of agricultural products.

(Base: the first quarter of 1929 = 100)

COUNTRIES	1929				1930			
	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Germany	100.0	94.8	99.5	96.8	87.1	83.2	86.4	83.1
England and Wales	100.0	99.3	102.8	99.3	100.0	93.1	95.1	88.9
Estonia	100.0	92.4	93.3	89.4	80.0	71.1	69.3	64.9
Finland	100.0	96.3	90.7	87.9	82.2	77.6	76.6	...
Hungary	100.0	92.5	79.9	73.9	68.7	61.9	61.9	...
Italy	100.0	96.3	90.2	88.2	82.3	77.3	75.4	60.5
Netherlands	100.0	99.7	101.4	97.1	89.3	84.6	86.4	78.9
Poland	100.0	94.7	92.0	89.8	78.4	76.3	75.0	...
Argentina	100.0	92.6	101.9	98.2	89.5	88.2	83.1	66.4
Canada	100.0	96.6	100.1	106.1	99.7	92.6	78.3	68.6
United States: Bureau of Agricultural Economics	100.0	100.0	103.7	100.7	95.6	91.9	80.9	75.0
Unit. Stat.: Bureau of Labor	100.0	97.5	100.9	96.4	92.3	87.3	79.5	74.5
New Zealand	100.0	97.0	95.4	87.1	80.5	77.4	75.3	64.1

Naturally all the qualifications concerning the incomparability of the indices for the different countries indicated in the Bulletin for July apply also to the preceding table, but it serves to confirm the depth to which the price-level in all the countries has fallen. The index-numbers of Germany, England and Wales, and the Netherlands in which a slight rise was to be noted in the third quarter of 1930 with respect to the preceding quarter, have now reached levels lower than ever, which is the case also for all the other countries. For Germany and the Netherlands the fall is very considerable but it is more accentuated in Canada, Argentina, and the United States. For the first of these three countries there is a decline of over 25 % as compared with the second quarter of 1930.

INDEX-NUMBERS OF PRICES OF AGRICULTURAL PRODUCTS AND OF COMMODITIES BOUGHT BY THE FARMER *

COUNTRIES AND CLASSIFICATION	Dec.	Nov.	Oct.	Sept.	August	July	Dec.	Dec.	Year	
	1930	1930	1930	1930	1930	1930	1929	1928	1929	1928
GERMANY (Statistisches Reichsamt) 1913 = 100.										
Foodstuffs of vegetable origin	111.3	110.9	108.8	116.7	124.0	119.7	120.4	126.1	126.3	142.2
Livestock	104.4	103.2	104.7	108.2	111.8	111.9	125.7	138.3	126.6	111.3
Livestock products	126.6	131.3	127.5	124.6	121.0	121.3	146.3	162.4	142.1	144.0
Feeding stuffs	91.1	87.9	87.2	96.8	100.4	97.1	105.0	137.0	125.9	147.4
Total agricultural products	110.4	112.0	109.3	113.5	116.6	114.8	126.2	134.1	130.2	134.3
Fertilizers	80.5	80.4	80.4	80.0	79.1	77.8	83.7	84.2	84.6	81.8
Agricultural dead stock	136.0	137.4	138.6	139.1	139.4	139.6	141.0	141.4	141.3	139.4
General index-number	117.8	120.1	120.2	122.8	124.7	125.1	134.3	139.9	137.2	140.0
ENGLAND AND WALES (Ministry of Agriculture) Average of corresponding months 1911-13 = 100.										
Agricultural products	126	129	129	142	135	134	143	140	144	147
Feeding stuffs	81	78	82	90	99	94	110	147	139	154
Fertilizers	101	100	99	99	99	103	100	97	100	98
General index-number (1).	102.2	104.2	106.4	106.8	108.5	111.1	128.0	138.7	135.3	141.2
ARGENTINA (Banco de la Nación argentina) 1926 = 100.										
Cereals and linseed	56.0	59.8	70.7	77.9	87.2	84.8	99.6	99.7	100.4	103.1
Meat	90.5	99.3	109.6	114.8	119.0	118.9	109.0	101.5	113.6	115.3
Hides and skins	65.6	70.4	72.3	70.6	67.8	70.5	78.0	131.0	95.0	151.6
Wool	51.8	57.3	62.2	64.9	65.1	70.4	81.3	116.8	103.5	123.1
Dairy products	68.7	72.6	78.5	80.3	79.7	80.8	99.0	104.3	105.9	99.6
Forest products	108.7	108.7	108.7	107.7	106.9	106.9	111.8	110.7	111.5	110.5
Total agricultural products	63.2	67.9	77.1	82.8	89.3	88.2	98.8	103.9	102.6	109.8
CANADA (Internal Trade Branch of the Dominion Bureau of Statistics) 1926 = 100.										
Field products (grain, etc.)	48.6	49.3	55.1	59.3	67.8	72.3	93.8	82.6	93.8	92.6
Animals and animal products	98.6	96.5	98.9	93.6	91.1	93.7	112.5	117.0	112.5	114.3
Total Canadian farm products	62.3	67.0	71.5	72.1	76.6	80.3	100.8	95.5	100.8	100.7
Fertilizers	90.9	90.9	90.8	91.5	91.5	91.5	92.6	92.8	92.6	93.3
General index-number	77.8	79.8	81.4	82.5	84.1	85.8	95.6	94.0	95.6	96.4
ESTONIA (Central Bureau of Statistics) 1922 = 100.										
Commodities imported	83	88	90	74	75	72	88.7	107.2	94.0	117.6
Commodities exported	68	72	72	85	84	88	102.7	123.1	112.8	122.6
Agricultural products imported and exported	70	74	75	78	78	79	97.5	118.0	105.7	117.4

* For an explanation of the method of calculation of the index-numbers, reference should be made to the Institute's publication "Index-numbers of Prices of Agricultural Products and other Price-indices of Interest to the Farmer" (Rome, 1930).
(1) Calculated by the "Statist", reduced to base-year 1913 = 100.

COUNTRIES AND CLASSIFICATION	Dec.	Nov.	Oct.	Sept.	August	July	Dec.	Dec.	Year	
	1930	1930	1930	1930	1930	1930	1929	1928	1929	1928
UNITED STATES (Bureau of Agricultural Economics) Average 1909-10 to 1913-14 = 100.										
Cereals	80	80	92	100	101	92	119	112	121	180
Fruits and vegetables	108	114	127	148	149	178	163	108	136	146
Meat animals	112	118	123	128	119	127	143	143	156	150
Dairy products	117	124	125	123	117	115	140	146	140	140
Poultry and poultry products	127	146	129	125	107	101	204	197	159	150
Cotton and cottonseed	73	80	70	83	94	99	130	148	145	152
Total agricultural products	97	103	106	111	108	111	135	134	138	130
Commodities purchased by farmers (1)	149	149	149	149	149	149	154	155	155	156
Agricultural wages (1)	129	—	—	150	—	160	(2) 159	(2) 162	170	169
UNITED STATES (Bureau of Labor) 1926 = 100.										
Grains	64.0	64.0	72.1	77.0	80.4	74.1	97.5	94.3	97.4	107.3
Livestock and poultry	76.3	77.7	82.4	88.0	84.6	81.8	94.6	90.1	106.1	105.4
Other farm products	78.1	85.4	86.3	86.4	86.7	88.9	108.2	110.0	106.6	105.8
Total farm products	75.2	79.3	82.6	85.3	84.9	83.1	101.0	103.6	104.9	105.9
Agricultural implements	94.9	94.9	94.9	94.9	94.9	94.9	96.1	98.8	97.9	98.8
Fertilizer materials	81.4	82.1	83.6	83.1	83.3	84.3	89.5	94.1	92.1	94.7
Mixed fertilizers	90.6	91.1	92.9	92.5	92.7	93.1	97.1	97.8	97.2	97.3
Cattle feed	78.2	83.0	80.6	93.6	104.8	94.8	122.4	137.0	121.6	138.1
Non-agricultural commodities	79.4	80.9	82.8	84.0	83.8	84.4	92.1	94.8	94.4	95.4
General index-number	78.4	80.4	82.6	84.2	84.0	84.0	94.4	96.7	96.5	97.7
FINLAND (Central Bureau of Statistics) 1926 = 100.										
Cereals . . . . .	...	71	68	69	74	75	82	107	98	111
Potatoes . . . . .	...	51	54	68	93	88	149	148	137	137
Fodder . . . . .	...	58	60	63	65	67	76	69	86	86
Meat . . . . .	...	70	77	85	92	98	93	100	103	104
Dairy products . . . . .	...	79	83	88	88	87	103	115	103	110
Total agricultural products . . . . .	...	74	75	78	83	86	92	108	100	110
General index-number . . . . .	...	87	86	88	89	90	95	101	98	102
HUNGARY (Central Bureau of Statistics) 1913 = 100.										
Agricultural and livestock products . . . . .	...	80	83	80	81	88	97	—	—	—
General index-number . . . . .	...	92	94	92	93	99	107	—	—	—
ITALY (Consiglio Provinciale dell'Economia di Milano) 1913 = 100.										
National agricultural products	356.88	373.77	390.97	409.93	413.48	404.84	474.78	538.32	508.76	530.72
General index-number	368.63	379.03	386.60	398.30	402.58	401.50	459.18	496.57	480.09	491.12
NEW ZEALAND (Census and Statistics Office) Average 1909-13 = 100.										
Dairy produce	102.6	104.8	110.2	113.7	123.9	123.9	144.1	149.3	145.7	147.3
Meat	160.0	146.5	143.7	153.3	154.3	160.2	163.2	178.4	170.9	169.9
Wool	59.3	79.8	80.2	95.5	102.4	105.8	127.4	132.9	138.6	132.4
Hides, skins, and tallow	122.6	98.9	112.1	104.2	168.4	139.9	103.7	105.8	178.9	197.5
Miscellaneous	129.8	126.0	114.7	130.9	112.0	125.2	155.1	141.1	146.7	142.4
Total agricultural products	101.3	107.4	114.3	117.8	131.5	130.1	142.5	133.5	131.3	135.4

(1) 1910-14 = 100. — (2) January following.

COUNTRIES AND CLASSIFICATION	Dec.	Nov.	Oct.	Sept.	August	July	Dec.	Dec.	Year	
	1930	1930	1930	1930	1930	1930	1929	1928	1929	1928
NORWAY (Kgl. Selskap for Norges Vel.) Average 1909-14 = 100.										
Cereals	99	101	100	118	125	125	142	161	(1) 155	(1) 182
Potatoes	158	155	172	200	117	130	105	130	(1) 120	(1) 231
Pork	98	102	98	96	95	96	153	170	(1) 141	(1) 157
Other meat	103	102	103	203	220	218	198	177	(1) 199	(1) 183
Eggs	146	179	151	124	118	108	180	184	(1) 135	(1) 150
Dairy products	150	158	158	157	157	156	171	178	(1) 161	(1) 178
Concentrated feeding stuffs	111	115	118	122	122	121	147	163	(1) 148	(1) 167
Maize	93	97	107	114	114	108	140	162	(1) 148	(1) 164
Fertilizers	85	101	106	99	102	105	105	100	(1) 108	(1) 104
NETHERLANDS (Directie van den Landbouw) Average 1924-25 to 1928-29 = 100.										
Products of the soil	59	61	68	73	76	42	65	79	(2) 68	(2) 87
Animal products	74	77	80	83	86	88	99	97	(2) 95	(2) 98
Total agricultural products	71	73	77	81	83	78	89	92	(2) 88	(2) 95
Agricultural wages	100	100	100	100	100	100	100	100	(2) 100	(2) 100
General index-number (3)	72.4	74.4	75.1	75.8	77.1	77.8	91.3	100.1	96.1	100.8
POLAND (Central Bureau of Statistics) 1927 = 100.										
Products of the soil . . . . .	...	47.6	45.8	49.9	56.4	56.7	62.0	82.9	73.1	97.9
Products of agricultural industry . . . . .	...	65.4	63.1	64.9	70.2	78.4	73.6	85.1	80.9	95.9
Animal products of plant origin . . . . .	...	56.1	54.0	57.1	63.2	66.9	60.2	84.0	76.9	96.9
Animals . . . . .	...	72.7	77.8	79.9	79.9	81.6	95.6	96.5	98.4	94.4
Dairy products . . . . .	...	97.0	88.2	70.0	72.4	74.9	103.6	127.8	102.9	104.6
Other products of animal origin . . . . .	...	84.0	82.4	70.6	76.5	78.6	98.9	109.4	100.2	98.6
Total agricultural products . . . . .	...	66.2	64.3	65.5	68.2	71.3	82.2	93.9	85.7	97.2
Fertilizers . . . . .	...	124.7	126.2	126.2	126.2	126.2	130.6	118.2	126.5	109.5
Industrial products . . . . .	...	89.8	90.6	91.8	93.2	94.2	101.1	104.1	103.3	104.2
General index-number . . . . .	...	78.9	78.4	79.6	81.8	83.8	92.0	99.5	95.7	101.0
YUGOSLAVIA (National Bank of the Kingdom of Yugoslavia) 1926 = 100.										
Products of the soil	72.5	71.4	77.3	78.0	93.9	96.7	102.3	130.1	118.6	130.1
Animal products	86.4	95.1	93.3	95.6	96.7	97.7	95.8	108.6	107.2	108.6
Industrial products	75.2	74.8	75.4	78.2	70.2	80.7	89.2	93.9	92.6	98.0
General index-number	78.0	79.2	80.0	82.8	87.7	88.8	93.7	104.1	100.6	106.2

(1) Agricultural year April 1-March 31. — (2) Agricultural year July 1-June 30. — (3) Calculated by the Central Statistical Bureau of the Netherlands, reduced to the base 1925-1929 = 100.

RATES OF FREIGHT

(Rates for full cargoes).

VOYAGES	Jan. 16, 1931	Jan. 9, 1931	Jan. 2, 1931	Dec. 26, 1930	Dec. 19, 1930	Average				Commercial Season	
	Dec. 1930	Jan. 1930	Jan. 1929			1929-30	1928-29				
SHIPMENTS OF WHEAT AND MAIZE.											
Danube to Antwerp/Hamburg	(shill. p. 2240 lbs.)	n. q.	n. q.	14/6	14/6	14/7	n. q.	n. q.	15/8	n. 14/9	
Black Sea to Antwerp/Hamburg		10/10½	10/10½	10/9	10/10½	10/10½	n. q.	n. q.	n. q.	n. q.	
St. John to Liverpool (1)		1/8	1/8	1/6	1/6	1/6	1/6	2/8	1/5	3/10	
Montreal to United Kingdom	(shill. per 480 lbs.)	n. q.	n. q.	n. q.	n. q.	n. q.	n. q.	n. q.	1/10	2/10	
Gulf to United Kingdom		(1) 1/9	(1) 1/9	(1) 1/9	(1) 2/-	(1) 2/-	(1) 2/2	2/5	3/6	2/6	
New York to Liverpool (1)		1/6	1/6	1/6	1/6	1/6	1/7	2/7	1/6	2/3	
Northern Range to U.K. and Continent		1/7½	1/7½	1/6	1/6	1/6	1/7½	1/10	3/6	1/9	
North Pacific to United Kingdom (shill. per 2240 lbs).		22/6	22/6	22/6	23/-	23/-	22/7	33/1	22/7	30/7	
Vancouver to Yokohama (1) (dollars p. sh. ton)		2.80	2.80	2.80	2.50	2.50	2.80	4.25	2.78	3.85	
Ia Plata Down River (2) to U. K./Continent		16/6	16/-	17/-	17/-	17/4½	12/11	24/10	12/8	22/1	
Ia Plata Up River (3) to U. K./Continent	(shill. per 2240 lbs)	18/8	18/-	18/6	18/6	18/6	19/1½	14/5	26/3	14/4	
Karachi to U. K./Continent (4)		20/6	20/6	21/-	21/-	20/4	19/9	n. q.	23/-	n. 13/4	
Western Australia to U.K./Continent		30/6	30/-	30/-	30/9	31/3	30/4½	24/7	40/7	25/7	
SHIPMENTS OF RICE.											
										1930	1929
Saigon to Europe	(shill. per 2240 lbs.)	n. 25/-	22/6	n. 20/-	n. 20/-	n. 19/-	n. 19/6	25/6	32/-	...	
Burma to U.K./Continent		22/3	22/6	23/9	n. 20/-	n. 20/-	n. 19/3	20/-	n. 26/3	n. 17/8	
										n. 17/8	n. q.

(1) Rates for parcels by liners. - (2) "Down River" includes the ports Buenos Aires and Ia Plata. - (3) "Up River" includes the ports on the Paraná River as far as San Lorenzo. Cargoes from ports beyond San Lorenzo (Colastine, Sant-Pé and Paraná) are subject to an extra rate of freight. - (4) The original data being quoted in "scale terms", 10 % is added to arrive at freights per 2240 lbs.

IMPORT DUTIES ON CEREALS AND FLOUR

CHANGES TO BE MADE IN THE DUTIES PUBLISHED ON PAGE 62 OF THE CROP REPORT OF THIS MONTH.

COUNTRY	PRODUCT	Date when enforced	Original datum per metric quintal	Datum in American cents per bushel
Germany	Wheat imported under Customs control for the preparation of wheat starch	15-I-1931	R. M. 11.25	73.10

MONTHLY CROP REPORT

AND AGRICULTURAL STATISTICS

The following notes refer to crop conditions quoted in the crop reports and in the tables. — Crop condition according to the system of the country: Germany, Austria, Hungary, Luxemburg and Czechoslovakia: 1 = excellent, 2 = good, 3 = average, 4 = bad, 5 = very bad; France: 100 = excellent, 70 = good, 50 = average, 30 = bad; Lithuania, Poland, Sweden and Switzerland: 5 = excellent, 4 = good, 3 = average, 2 = bad, 1 = very bad; Netherlands: 90 = excellent, 70 = good, 60 = fairly good, 50 = average, 40 = bad, 30 = very bad; U. S. S. R.: 5 = good, 4 = above the average, 3 = average, 2 = below average, 1 = bad; Unemployed: 100 = crop condition which promises a normal yield. — For other countries the system of the Index employed: 100 = crop condition which promises a yield equal to the average of the last ten years.

SUPPLIES AND REQUIREMENTS OF WHEAT

In the Bulletin of last November it was estimated, on the basis of the preliminary estimates then available, that the world production for 1930 slightly exceeded requirements for consumption and that, as a consequence, the stocks of wheat in existence on August 1, 1930, having risen to the abnormally high level of 245 million centals (418 million bushels), would experience a further increase at the end of the grain season. It was forecasted, therefore, that the exportable stocks to be carried over to the season 1931-32 would reach the figure of 260 million centals (440 million bushels), equalling the maximum previously obtained at the end of the season 1928-29. Now that the data of wheat production for last year in the northern hemisphere may be considered to be practically finally ascertained and estimates are possessed of crops just harvested in the southern hemisphere, it is interesting to re-examine, in the light of modifications which have taken place in the meantime in the data which formed the basis of the previous calculations the present prospects of the situation of supplies and requirements of wheat during the current season (August 1, 1930-July 31, 1931) taking into account also the movement of exports and imports in the first five months of the same season.

EXPORTING COUNTRIES.

North America. — The total estimate of production in North America is slightly higher than that of last November, as both the United States and Canada have made small increases in their preliminary estimates. The production of the two countries is now calculated at 749 million centals (1,249 million bushels) showing an increase of 9 million centals (14 million bushels) over the previous estimates. With regard to home consumption of wheat, no new data are possessed indicating a modification of the estimate of 518 million centals (863 million bushels) made in November and it is therefore left unchanged, subject to modification when the spring estimates of total stocks existing in the two countries are available. The exportable quantities in North America,

which were calculated, on the basis of the preliminary estimates of production, at 430 million centals (717 million bushels) are therefore increased by 9 million centals (14 million bushels), reaching a round figure of 440 million centals (730 million bushels).

Argentina. — As the official forecast of production in Argentina had not been published in November and data of stocks were lacking, it was approximately calculated that the exportable surplus of the new and old productions was about 120 million centals (200 million bushels). At the end of December the Argentine Government communicated the first forecast for the new crop at 163 million centals (271 million bushels) and has recently published the second estimate, which, taking into account the damage caused by weather unfavourable to ripening and harvesting, gives a lower figure of 143 million centals (239 million bushels). Exportable stocks from previous production existing on December 18, 1930 amounted to 11 million centals (18 million bushels); supplies for 1931 therefore amount to 154 million centals (257 million bushels); deducting the quantities necessary for home consumption and seeding purposes (54 million centals or 90 million bushels) there remains available for export in 1931 the quantity of 100 million centals (167 million bushels). To obtain the quantity which Argentina is able to place at the disposal of the foreign market during the period August 1, 1930-July 31, 1931, it is necessary to add to the quantities available on December 18, those previously exported from August 1 to December 17, which amounted to 10 million centals (17 million bushels). Consequently, the exportable supplies for the present season reach a round figure of 110 million centals (185 million bushels), representing a reduction of 10 million centals (15 million bushels) compared with the November forecast.

Australia. — For this country production is estimated at 123 million centals (205 million bushels), with a reduction of a little over 5 million centals (9 million bushels) compared with the forecast of last November. The home consumption of Australia in recent years has averaged at about 28 million centals (48 million bushels) with a maximum of about 33 million centals (55 million bushels) in 1930. Even admitting a later expansion of direct consumption for food and fodder corresponding to the present low prices, it does not seem prudent to make much increase compared with last year in the estimate of the quantity which may be absorbed by the home market, the more so as it seems probable that there will be a reduction in the areas to be sown under wheat in the next three months and a consequent diminution in the quantities needed for sowing. It is considered therefore that the Australian home consumption of wheat in the year 1931 may be estimated at 36 million centals (60 million bushels). Subtracting this figure from the 123 million centals (205 million bushels) of new production, there remains 87 million centals (145 million bushels) available for export and adding to this 23 million centals (39 million bushels) of exportable stocks from previous production in existence in the country on August 1, 1930, a total quantity exportable during the season 1930-31 is obtained of about 110 million centals (185 million bushels).

India. — The good wheat crop obtained in India last spring after several years of poor or mediocre production was in excess of normal home consumption by about 33 million centals (55 million bushels) and for this reason it was considered last November that this country would resume its rôle of wheat exporter, which it lost some years ago. It was anticipated, in fact, that India, while not being able to place on the market the total surplus calculated, owing to the probable increase of consumption in correspondence to the current low prices and the necessity to build up stocks reduced in the years of poor production, would be in a position to export, after August 1, about 18 million cen-

tals (30 million bushels). It is a fact that in the five months from August to December the net exports from the country were only 1 million centals (2 million bushels) i. e. 4 million centals of exports and 13 million centals of imports (4.0 million bushels of exports and 2.2 million bushels of imports), on the other hand, in the last few months imports exceeded exports and at present, the country has made large purchases of foreign wheat, especially Australian.

On the other hand the information available for the next crop is not very satisfactory since crops in several important producing areas have suffered damage from the drought, so that it seems probable that the crop will not be so abundant as last year's, notwithstanding the greater area sown. In view of these considerations it seems advisable to exclude India from the surplus-producing countries for the current year and to assume as nil its export supplies for 1930-31.

U. S. S. R. — Exact data are not yet available for wheat production in 1930, it being known only that the total production of bread and fodder grains is much above that of the past year, which was itself fairly plentiful. In November it was conjectured that the wheat available for export from the Soviet Union in the present season would be in the neighbourhood of 45-55 million centals (70-90 million bushels). In the first six months, however, from 1 August 1930 to the end of January 1931, there was already exported 40 million centals (70 million bushels), though in the last week there was some slackening in the export. As a provisional figure 55 million centals (95 million bushels) may be adopted for the amount of Russian wheat exportable, bearing in mind once more the obvious reservations.

Minor Exporters — Of the four Danubian countries only Rumania has modified the provisional estimate of November, raising the amount harvested from 75 to 78 million centals (125 to 131 million bushels). The total production of these countries rises, therefore, from 207 to 210 million centals (346 to 352 million bushels). It was estimated in November that, notwithstanding this year's abundant wheat production, the Danubian countries would be able to export only 30 million centals (50 million bushels), an amount a little inferior to that of last year, assuming that the maize crop, a source of food supply for a considerable portion of the population, was mediocre. On the basis of the increased estimate for Rumanian production, the estimate of exportable surplus for the Danubian countries reaches 35 million centals (60 million bushels).

It should also be borne in mind that the good harvest in Poland, for which the estimate has recently been raised by six million centals (ten million bushels) permits that country to figure modestly on the grain market; during the first six months of the present season it has exported about 15 million centals (25 million bushels) and has still further amounts available for export. It may therefore be calculated that the total export surplus for 1930-31 of the Danube countries and Poland will be round about 38 million centals (64 million bushels) of wheat. Adding to this the surpluses of the three North African countries, which appear to be greater than the four million centals (seven million bushels) forecast in November, a total export surplus of about 45 million centals (75 million bushels) is arrived at for the minor producers.

Total Exportable Quantities. — Summing up, the quantities of wheat available in the exporting countries for the supply of the importing countries in the current cereal year are estimated to be as follows in comparison with the preceding year.

Exportable quantities.

	million centals		mill on bushels	
	1930-31	1929-30	1930-31	1929-30
Canada and United States	440	397	730	661
Argentina	110	110	185	185
Australia	110	60	185	100
India	—	—	—	—
U. S. S. R.	55	4	95	7
Danubian countries, Poland, N. Africa, etc.	45	42	75	69
Totals (round figures)	760	610	1,270	1,020

The total available for 1930 so calculated leaves unaltered the estimate published in November, since the slight increases in North America, the U. S. S. R., and the minor exporters are balanced by the decrease in Argentina and the absence of surplus in India.

IMPORTING COUNTRIES.

Europe. — With regard to requirements for consumption it was calculated in November that the European countries, to cover the difference between home production and probable consumption, would have to import about 400 million centals (660 million bushels) compared with 303 million centals (505 million bushels) in the season 1929-30. Of this quantity, about 30 million centals (50 million bushels) could have been furnished by the surplus-producing countries of Europe itself and the remainder by overseas countries and the U. S. S. R.

The estimate of the total production of Europe in 1930 has been slightly increased since November, principally as a result of revisions in the crop estimates of Germany, Poland and Rumania. The total European production is therefore changed from 803 million centals (1,339 million bushels) as estimated in November to 818 million centals (1,363 million bushels), representing an increase of about 15 million centals (24 million bushels). Despite this larger supply resulting from home production, it does not appear to be expedient to lower the requirements of 400 million centals (660 million bushels) as forecasted in November. On the other hand, taking account of various conjectural data, it seems opportune to raise it, even if only slightly. In most European countries customs duties on wheat have only partly compensated for the fall in prices that has occurred on the markets of the countries of origin so that home prices of wheat are still far below those of last season and preceding seasons. In other countries moreover, including some important wheat consuming countries, the wheat has remained duty free or the duty has been of negligible importance.

It should therefore be regarded as probable that there will be a certain expansion of wheat consumption in a notable proportion of the European countries, the more so as in this period of economic crisis and severe unemployment a large part of consumption is diverted to cheaper foodstuffs among which are bread and macaroni. It is therefore considered possible that European demands for wheat will average about 410 million centals (680 million bushels), showing an increase of 10 million centals (20 million bushels) over the November forecast. This hypothesis is supported by the statistics of imports in the first five months of the present season (August 1-December 31) compared with the corresponding figures not of last year but of 1928-29. The comparison is not made with last year because of the fact that production in 1929 was very heavy, particularly in the European importing countries, and reduced their demands on the markets of supply to a minimum. In the year 1928-29, on the contrary, the same countries had a total production closely approaching that of 1930.

Import of wheat
(wheat and flour reduced to terms of wheat)

Countries	Five months imports August 1 to December 31 1930		Five months imports August 1 to December 31 1929	
	million centals		million bushels	
Germany	82	187	156	311
Austria	31	36	51	61
Belgium	121	111	202	184
Denmark	26	37	44	61
Estonia, Finland, Latvia, Lithuania	27	28		47
France	108	124	180	0
Great Britain and Ireland	699	526	1165	876
Italy	201	105	334	330
Netherlands	77	79	167	131
Sweden and Norway	44	16	73	77
Switzerland	53	40	98	67
Czechoslovakia	75	53	125	88
Totals	1559	1475	2597	2456

Total imports in the season 1929-30 amounted to 389 million centals (649 million bushels). If imports in the months from January to July of this year are maintained in correspondence to those of the same period of 1929-30 total will be obtained of nearly 410 million centals (680 million bushels) which corresponds to the estimate of probable requirements as calculated above.

Anticipations. Despite the fact that shipments in the first three months of the present season remained somewhat below the corresponding ones of last year it was estimated last November that the requirements of this group of countries would exceed those of 1929-30 calculated at 55 million centals (140 million bushels) and would reach 100 million centals (160 million bushels). The shipments of the second quarter have in fact shown a large increase so that the total quantity shipped during the first six months of the present season exceed the corresponding ones of last season.

It may be maintained that the November estimate may be fully attained and perhaps even surpassed particularly if some means is found to stimulate the demand for wheat in China which has in recent months been an important purchaser on the world market.

World Requirements. Summing up the quantities necessary to meet the demands of the importing countries during 1930-31 should be 410 million centals (680 million bushels) for Europe and 100 million (160 million) for extra-European countries, that is a total of 510 millions centals (840 millions bushels).

End of Season Stocks. — Comparing on the one side the export surpluses of the present season estimated at 760 million centals (1270 million bushels) and on the other the probable world demand estimated at 510 million centals (840 million bushels) it would appear that on 31 July 1931 there will remain a carryover of 250 million centals (430 million bushels) into the 1931-32 season a figure slightly below that forecast last November but still very high and only slightly exceeded by the maximum of 1 August 1929.

The heavy accumulation of stocks, which in recent years have exceeded 250 million centals (400 million bushels), the normal amount being less than half that figure has caused in the current season a marked depression of wheat prices, which, as is well-known, have fallen to levels unprecedented in the last thirty years. In view of the serious difficulties caused by this situation to producers throughout the world it is opportune to examine its origin and the prospects for the current year.

In recent years the production of wheat has shown a marked tendency to increase. If the average world production (excluding the U. S. S. R. and China) for the triennia 1925-27 and 1928-30 are compared, production is seen to have risen from the one period to the other from 2,070 to 2,200 million centals (from 3,450 to 3,670 million bushels). This increase cannot be said to be due to fortuitous circumstances, such as a series of exceptionally abundant harvests following on favourable meteorological conditions, since the average yields per acre have maintained an almost constant level. The increase in production is related, therefore, to that in the area devoted to wheat and this area has, in fact, risen from around 227 million acres in 1925-27 to 242 in the succeeding triennium. To the increase of 15 million acres in area there corresponds the yearly increase of 130 million centals (220 million bushels) in production.

It must also be noted that the great development of wheat cultivation has almost exclusively occurred in the four large overseas exporting countries — Canada, the United States, Argentina and Australia — which have together harvested during the period 1928-30 an average of 120 million acres against 107 in 1925-27 while in all other countries during the same periods there has been no considerable change — 122 millions against 119.

In 1930 the world wheat area harvested (excluding the U. S. S. R. and China) has reached 245 million acres and the area sown has greatly exceeded 250 million acres.

If in the agricultural year just commenced the areas sown maintain the level reached last year there appears little probability that there will be a lightening of the stocks that at present depress the market. In fact, in the last quinquennium the world yield per acre has averaged 15.2 bushels, oscillating between a minimum of 14.5 and a maximum of 16.2. On this basis it may be calculated that in normal circumstances an area of 250 million acres (equivalent to that of 1930, excluding the U. S. S. R. and China), would correspond to a production of 2,200 million centals (3,670 million bushels). Such a production would exceed the absorptive capacity of the world market, even admitting that consumption may be increased owing to the fall in prices and excepting the possibilities of production and of export of the U. S. S. R.

The information so far available concerning areas sown to winter wheat in the northern hemisphere, though incomplete, do not so far show any sensible diminution as compared with last year. Amongst the exporting countries that have published estimates of the extent of autumn sowings only Rumania and Algeria show a considerable reduction in comparison with 1930, while the others report a practically stationary situation; it has been known for some time that the United States have reduced by hardly 1 % their important winter wheat area. In some European countries there has been reported a notable increase in the wheat area, due to substitution of rye for wheat. Besides, there has been a marked increase in the U. S. S. R., and a distinct increase in India. It remains to be seen what will be the course of the next sowings of spring wheat, especially important in Canada, the United States, and the U. S. S. R., and also, later, the sowings in Argentina and Australia.

The condition of the winter crops during January was fairly good throughout almost the whole of Europe. The winter has been very mild and days of severe cold rather

infrequent. In some countries excessive rain and weeds have been reported. In the United States there was a long period of dry weather, which caused some anxiety for the crops. In the first half of February there was, however, precipitation, which, though not in the quantity desired, ameliorated the condition of winter crops, which was considered as fairly satisfactory. In India the rains appear to have arrived too late to compensate for the damage caused by the preceding drought and a crop less plentiful than last year's is expected.

G. C.

CEREALS

Austria : In the first week of January mild weather continued but toward the middle of the month a sharp fall in temperature occurred and in the latter half of the month weather was rather cold. In the northern Alps a considerable amount of snow fell, but in the south and east of the country precipitation was scanty.

Due to the mild weather winter sowings have a good appearance. On 1 February crop condition was as follows : winter wheat 2.4 (against 2.4 on 1 January 1931 and 2.5 on 1 February 1930) ; winter rye 2.4 (2.2 and 2.4) ; winter barley 2.4 (2.4 and 2.5).

Bulgaria : The crop condition of winter cereals is excellent. No damage is reported due to frost as the ground is everywhere covered with snow which in the first half of January varied from 5 to 10 cm. in depth. Weather during January was fine and during the latter half of the month temperatures were higher than usual, causing the snow to melt. In the last two or three days of January there were frequent falls of snow throughout practically the whole of the country.

Irish Free State : Weather in January was mild and no damage was caused to any crops in the ground. Germination was regular and the crops are in vigorous condition. Practically no additional sowings of winter grain were made owing to the wet condition of the soil. Farmers retained the seed in hopes of sowing in February. Cultivation preparatory to spring sowings is being carried out under average conditions.

France : The dry cold weather of the second week of January did not last long ; the latter half of January and the beginning of February were marked by excessively wet and mild weather, save in the southeastern region. These conditions were unfavourable to wheat, which suffered on lowlying and wet lands, and not a few thin areas are reported, some to be resown, and it is feared that braiding will be poor. Towards 7 February the weather became colder. In the Southeast the crops which had been very good, suffered somewhat from frosts at the end of January, the depth of snow being insufficient for protection. Oats, rye and barley have a better appearance. Cultivation has been very difficult, in several regions since the end of January even impossible ; only very little wheat has been sown since 1 January and preparation for spring sowings is backward. Threshing has been hindered by the wet weather, and the grain threshed is often moist and of low specific gravity.

Great Britain and Northern Ireland : Though the weather in January varied considerably throughout the area it has continued to be comparatively mild. The occasional frosts were not sufficiently prolonged to be of much benefit to the land. Precipitation was in general excessive. In Northern Ireland and on heavy and low-lying lands in England and Wales work was backward, though in Scotland and on medium and light lands in England and Wales progress was good and arrears of ploughing were overtaken

Area sown with Winter Cereals.

COUNTRIES	WHEAT			RYE			BARLEY			OATS		
	1930/31	% 1930/31		1930/31	% 1930/31		1930/31	% 1930/31		1930/31	% 1930/31	
		1924- 1925 to 1928- 1929	1924- 1925 to 1928- 1929		1924- 1925 to 1928- 1929	1924- 1925 to 1928- 1929						
		= 100	= 100		= 100	= 100						
		= 100	= 100		= 100	= 100						
(thousand acres)												
Germany . . .	4,324	100.9	—	10,379	90.4	—	494	101.0	—	—	—	—
Bulgaria . . .	2,608	100.0	110.8	583	95.0	180.9	514	100.0	117.3	—	—	—
Finland . . .	32	108.0	182.6	560	100.0	98.5	—	—	—	—	—	—
Italy . . .	11,893	101.1	—	—	—	—	—	—	—	—	—	—
Lithuania . . .	410	113.3	182.5	1,136	116.6	—	—	—	—	—	—	—
Rumania . . .	6,047	88.0	85.7	792	86.6	121.6	247	76.4	98.0	—	—	—
— Kruina . . .	13,902	142.0	191.4	12,867	93.6	101.1	—	—	—	—	—	—
Canada . . .	894	85.8	94.4	944	81.0	147.8	—	—	—	—	—	—
United States . . .	42,042	98.9	98.6 (2)	1,683 (2)	104.1	109.2	—	—	—	—	—	—
British India . . .	30,364	103.6	99.7	—	—	—	—	—	—	—	—	—
Algeria . . .	2,958	84.0	91.0	5	142.4	144.1	2,065	87.0	92.9	519	82.4	80.1
Tripolitania . . .	17	140.0	—	—	—	—	371	150.0	—	—	—	—
Tunis . . .	1,730	100.0	100.6	—	—	—	988	100.0	79.5	99	100.0	94.7

(1) Percentage of the mean for 1924/25 to 1927/28. — (2) Acreage sown for grain allowance being made for average diversion to other uses.

in several areas. In Northern Ireland it is reported that the continued bad weather has resulted in a decrease in the area laid down to wheat and that some farmers have delayed sowing the crop until February. The comparatively mild weather has been favourable to the growth of autumn-sown corn and crop condition at the end of January was generally good, though drier weather would be beneficial. Wheat was regular and healthy, though on wet lands in England and Wales a little loss of colour was reported. Autumn sowings of barley, though small, were generally satisfactory. Oats were promising, though in some areas growth was rather slow and the plant lacked colour. Rye was generally a strong plant.

In Scotland it would appear from the latest estimates of area sown that there will be a further diminution this year in the acreage under wheat. In several districts the acreage is said to be smaller than that of last year by 5-10 %.

Stocks of cereals remaining on farms on 1 January 1931 in England and Wales were, as was to be expected in view of the lower production in 1930, appreciably less than at the corresponding date in 1930, the reduction being especially pronounced in the case of barley. The following is a comparative table:

Cereal Stocks on farms in England and Wales.

	1 Jan. 1931		1 Jan. 1930	
	1000 tons	% 1930 crop	1000 tons	% 1929 crop
Oats	751.8	56	819.6	54
Wheat	531.4	56	562.5	44
Barley	293.0	40	418.0	42

The estimates of cereal production in Northern Ireland now available are given in the following comparative table:

Cereal Production in Northern Ireland:

	1930-31 1000 centals	1930-31 1000 bushels	% of 1929-30	% of 1924-25/ 1928-29
Oats	6,209	19,403	96.7	99.9
Wheat	102	171	120.2	94.0
Barley	48	99	116.8	116.0

Hungary : In the five weeks from December 10, 1930 to January 16 of this year, the weather has been characterised by mild temperatures and frequent and abundant precipitation. Towards the end of the period considered the temperature gradually began to fall. The larger part of precipitation fell in the form of snow.

Winter sowings sprouted uniformly and began the winter in sufficiently vigorous condition. Field mice caused occasional damage to the sowings. Towards the middle of January, the snow cover afforded adequate protection for the sowings although a deeper cover was desirable in some regions.

(Telegram of 23 February) : Weather is favourable to autumn sowings. Sporadic damage has been caused by frosts.

Italy : During the first fortnight of January weather was changeable with prevalently low temperatures. Only in some provinces frosts caused slight damage. In the few localities where the weather was distinctly unfavourable work slackened or was suspended. Sowings are on the whole in good condition. In the second half of the month snow was plentiful, especially in the mountain zones. Frosts have not caused any further damage to crops. Almost everywhere seasonal operations for sowing have made good progress. Cereals sowings are vigorous. Fieldmice continue to infest certain sections in the South.

Latvia : The average temperature for January was a little below the normal. At first it was moderately cold, then towards the end of the month it became colder. Snowfall was heavy and in some mountain regions reached a depth of 28 inches.

Lithuania : The winter has been rather severe with a fair amount of snow. Winter cereal sowings were effected under relatively good conditions and germination was regular and uniform.

Rumania : At the beginning of February the fields were covered with snow in the provinces of Bessarabia, Bukovina and Moldavia, and also in the mountain and hill regions of the remaining provinces. In the plain the snow is generally not thick ; in some districts the soil was quite bare. Condition of the sowings, however, was satisfactory. Frost in the last ten days of January caused no damage to the sowings.

Yugoslavia : In the first decade of January the weather was variable with abundant snow, though temperatures remained mild. In the last two decades of the month the clear, cold weather with night frosts lasted up to the end of the month, without, however, causing damage to sowings, which are well protected by snow.

Argentina : In the following table are given the second series of estimates of production of cereals in Argentina, which are considerably below the forecasts made in December due to frequent rainfall in the final ripening period and during harvesting operations :

		1930-31	1929-30	Average 1924-25 to 1928-29	Percentages 1929-30 = 100	Aver. = 100
Wheat	(1000 centals)	143,301	97,547	149,246	146.9	96.0
	(1000 bushels)	238,830	162,575	248,739		
Barley	(1000 centals)	6,834	7,743	7,082	88.3	96.5
	(1000 bushels)	14,238	16,132	14,755		
Oats	(1000 centals)	15,873	21,854	20,328	72.6	78.1
	(1000 bushels)	49,604	68,294	63,526		
Rye	(1000 centals)	2,646	2,465	3,022	107.3	87.5
	(1000 bushels) •	4,724	4,401	5,397		

Wheat stocks available for export on February 14 are officially estimated at about 88.2 million centals (147 million bushels).

United States : During the last week of January the crop condition of winter wheat remained good but some deterioration was reported to the Department of Agriculture resulting from the lack of snow cover, especially in the Ohio valley, where there was some damage caused by thawing and freezing ; in this area however, condition was still fair to good with deterioration noted in some parts. The unfavourable feature is the lack of soil moisture, especially as relates to the subsoil, over a large area from the central Mississippi valley eastward and particularly in the Ohio valley.

In the southwestern parts of the belt condition of the crop remains satisfactory but moisture is needed in many sections, although no materially unfavourable effects have yet been observed ; in this area the mild weather favoured wheat and preparations for spring grain seeding made more than normal advance. The absence of snow in central Rocky Mountain regions was very unfavourable for winter grains especially in Wyoming where winds were detrimental. Moderate temperatures and more or less general precipitation were helpful in the Pacific States. Winter grains are doing well in the Southeast but moisture is needed in the middle Atlantic sections.

In the first week of February, according to further telegraphic information received from the Department of Agriculture at Washington, winter wheat suffered slight damage for want of snow cover and damper weather was also desired. In the second week conditions rather improved ; the drought was largely relieved but still more rain was needed ; snowfall was partial. Crop condition of winter wheat on about February 11 was good.

India : Except for light rains at the end of January, weather during the month was dry and at the beginning of February rain was badly needed. The condition and prospects of crops was average to good on irrigated areas and below the average to average on unirrigated areas. In the United Provinces local damage to crops is reported due to insects, frost and want of rain but at the end of January crops were doing well.

According to a telegram received from the Government of India on February 17th the second estimate of the area under wheat in the Punjab for the season 1930-31 is 10,866,000 acres against 11,029,000 in 1929-30 and 10,774,000, the average for the preceding five seasons ; percentages 98.5 and 100.9 respectively. Condition of wheat was 90 % of the normal compared with 98 % at the corresponding period of 1930.

Japan : In January weather conditions were favourable to germination of wheat and barley, which were regular and uniform.

Palestine : Sowings have been effected under good conditions. Germination has taken place in a regular and uniform manner. The outlook for the development of crops is satisfactory at present, and there is every prospect of a very good return. Weather conditions have been excellent. Seasonable rains, interspersed with spells of fine, warm weather, have brought on the *afir* sown crops (*i. e.* winter cereals sown before the advent of the autumn rains) rapidly. *Afir* wheat and barley are well advanced throughout the country and in some places growth is so luxuriant that both crops will have to be grazed or cut. A good deal of the winter sown wheat and barley is above ground ; sowing is still in progress throughout the country. Prices of barley show a slight increase, but wheat remains steady. Oats sowing has been completed. Good germination and forward growth are noted.

Turkey : In the first decade of February temperature fell in the Smyrna region. There was continued rain and lowlying lands were flooded.

Algeria : The first sowings were effected under very difficult conditions, through lack of rain ; those of December and January however, were favoured by good conditions, rains having fallen in that period, though these delayed the work at the end of December and beginning of January. After 10 January the weather was fairly good on the whole and favourable to crops.

The following table gives the areas sown at different periods of the year and also the final figures for areas harvested in previous years.

	1931	1930	Average 1925-1929	Percentages 1930 = 100	Average = 100
	Thousand acres				
Wheat :					
Sowings on 1 January	2,476	3,237	2,869	76.5	86.3
" " 1 February	2,958	3,484	3,251	85.0	91.0
Total area sown on 1 March.	—	3,608	3,338	—	—
Area harvested	—	3,944	3,654	—	—
Barley :					
Sowings on 1 January	2,555	3,287	3,020	77.7	84.6
" " 1 February	2,965	3,410	3,193	87.0	92.9
Total area sown on 1 March	—	3,472	3,247	—	—
Area harvested	—	3,602	3,445	—	—
Oats :					
Sowings on 1 January	494	556	526	88.9	93.7
" " 1 February.	519	630	583	82.4	89.0
Area harvested	—	633	605	—	—

Examination of the table shows on the one hand that the figure given on 1 February may be considered as an approximate estimate of total area sown, on the other hand that this approximate estimate is considerably below the final figure of total area ; however,

with the exception of 1925, for which the figures for January and February are incomplete, the deviation has never been greater than 494,000 acres for wheat and 395,000 for barley. It may, therefore, be estimated that the total area on which the crop will be harvested will not reach 3,460,000 acres for wheat and that this will consequently be the poorest crop since 1923 in Algeria, while the area of barley harvested will be less than 3,361,000 acres, which though inferior to the areas harvested since 1929 will not show such a great deviation.

The total area devoted to cereals on 1 February 1931 is 6,447,000 acres against 7,527,000 in 1930 and 7,006,000 on the average of the years 1925-29.

Germination of December sowings has been hindered by the drought and brairding has been irregular: brairding of sowings made at the end of December and in January has been good and the weather in January has been favourable to young cereals.

Egypt: Weather conditions in January were favourable to growth which was normal for wheat and good for barley. The rain which fell during the month in Lower-Egypt had a favourable effect on plants, particularly those which had not been watered before the winter closures (December 30th) and are therefore watered by means of artesian wells. The growth of late-sown areas is making slow progress owing to cold weather and delay in sowing. Flowering has started in some early-sown areas in Fayum Province.

The crop condition of wheat and barley on February 1 was 100, the same as on January 1 this year and February 1, 1930.

Kenya: The area of wheat harvested in 1930 was 74,300 acres against 63,200 in 1929 and 51,900, the five-year mean (percentages 117.5 and 143.3). Production was 625,300 centals (1,042,200 bushels) against 586,900 (978,200) in 1929 and 265,500 (442,500) the five-year mean (percentages 106.5 and 235.5).

Tunis: Sowing has been effected under good conditions in the North: in the Centre and South it was hindered by drought up to the end of December, but from this date was favoured by general rain over the whole territory. Germination was regular in the North and more or less irregular in the Centre and South according to district.

The figure for the area sown as on February 1 is the same as that for January 1; the area under cereals this year is about the same as last year.

Spring field work is proceeding under good conditions.

Union of South Africa: The final estimates for production of winter crops on European holdings have been issued and are as follows, the figures for 1929 and the mean of 1924-28 being given for comparison. The data refer to grain only.

		1930	1929	1924-28	Percentages 1929 = 100	1924-28 = 100
		—	—	—	—	—
Wheat	(1000 cent.)	6,108	6,684	4,332	91.4	141.0
	(1000 bush.)	10,180	11,140	7,220		
Oats	(1000 cent.)	1,895	3,293	2,101	57.5	90.2
	(1000 bush.)	5,920	10,289	6,567		
Barley	(1000 cent.)	502	1,006	518	49.9	96.9
	(1000 bush.)	1,046	2,097	1,079		

Though production for 1930 shows a reduction on that of 1929, it has to be remembered that the latter was a record year. The reduction in wheat production in the cur-

rent season has taken place despite the increase of area by 20.7 % as compared with last season. Reduced yields are due chiefly to the dryness of the winter and early spring. In the Transvaal the spell of cold weather and frost in September-October also somewhat affected yields. A fair amount of damage was also caused by lice in the southeastern districts of the Orange Free State. Damage by rust is also reported in various areas of the southwest and south coast districts of Cape Province, but on the whole the wheat crop has been comparatively free of this disease and the grain should be of high quality.

This season's wheat production is estimated to cover rather under 70 % of the country's requirements. It is expected that the area under wheat will be maintained or increased at the expense of other winter crops, in view of the restrictions on wheat imports and the unsatisfactory prices for the other cereals.

Australia. (Telegram of 16 February): Harvesting has been delayed by unseasonable weather and the quality of the grain affected by the rains. Yields vary in all States from fair to good except in Western Australia, where expectations have been surpassed.

New Zealand. (Telegram of 9 February): According to the first estimate, production for 1930-31 is as follows, the final figures for last year and for the preceding quinquennium being given for comparison:

		1930-31	1929-30	Average 1924-25/ 1928-29	Percentages 1929-30 = 100	Average = 100
Wheat	(1000 cent.)	3,900	4,344	4,367	89.8	89.3
	(1000 bush.)	6,500	7,240	7,278		
Oats	(1000 cent.)	1,381	1,171	1,696	117.9	81.4
	(1000 bush.)	4,314	3,659	5,299		
Barley	(1000 cent.)	398	378	462	105.3	86.0
	(1000 bush.)	828	786	962		

The data refer to cereals for threshing only.

MAIZE

France: The following table gives the area, production and yield for 1930, compared with those of preceding years.

		1930	1929	Average 1924-28	Percentages 1929 = 100	Average = 100
Area	(1000 acres)	762	852	849	89.5	89.7
Production	(1000 cent.)	12,333	11,002	9,358	112.1	131.8
	(1000 bush.)	22,023	19,646	16,711		
Yield	(cent.p. acre)	16.2	12.9	11.0	125.5	148.0
	(bush.p. acre)	28.9	23.1	19.7		

This year's crop is the best since 1914, though area shows a further decrease. Production is only 375,000 centals (669,000 bushels) below the 1909-13 average, yield per acre being the highest so far recorded in France.

Kenya: The area harvested for maize in 1930 was 212,800 acres against 234,000 in 1929 and 169,100, the average of the preceding quinquennium (percentages: 90.9 and 125.8).

Production is 3,569,000 centals (6,374,000 bushels) against 3,717,000 (6,638,000) in 1929 and 2,089,000 (3,730,000) the five-year mean (percentages: 96.0 and 170.9).

Union of South Africa : Indications so far are that the area this season is considerably reduced owing to the very dry spring. Rains have fallen generally over the maize belt since the end of December but too late to enable any subsequent plantings on the highveld to mature before the early winter frosts.

RICE

Colombia : An organization has been formed in the Department of El Valle to engage in the cultivation of rice in the lowlands along the Cauca River. It is considered that at least 7,400 acres will be planted to this crop.

India : Except for scattered showers at the end of January no rain fell during the month in Bengal; much preparatory tillage for autumn crops has been done.

Indo-China : In Tonkin flowering and spiking of eight-, nine-, and ten-month varieties, as well as ripening of the first, early varieties, took place under good conditions and good yields are expected.

Early eight-month varieties, which had suffered from the drought, had resumed normal vegetation in North-Annam and South-Central-Annam, thanks to the rains of September and gave promise of good yields, but in North-Central and South-Annam the crop has been deficient, owing to the drought followed by the floods. Seasonal and late varieties (ten-, eleven-, twelve-month) had a satisfactory appearance at the end of September.

In Cochin-China expectations were good, the crop not having suffered from the drought.

In Cambodia and Laos the rains at the end of September nearly everywhere compensated for the effects of the drought and an average crop was anticipated, in Cambodia superior to that of last year.

Japan : According to the most recent estimate production in 1930-31 is 266,446,000 centals (592,091,000 bushels), 112.2 % of that of 1929-30 and 113.3 % of the five-year mean.

POTATOES

Data are now available for the crop in France, which occupies third place amongst the leading European producers (excluding the U. S. S. R.). The rather pessimistic forecasts are entirely confirmed; the 1930 crop is in fact nearly 20 % inferior to that of 1929, though the latter, it should be remembered, was the largest since 1910 (excluding the exceptional crop of 1927); the present crop is even 5 % below the mean of the preceding five years. In view of the importance of France as a potato producer its smaller crop and the relatively poor crops with respect to last year in Poland, Czechoslovakia and Great Britain have had a considerable repercussion on the European total, which is more than 6 % inferior to that of 1929, a record crop, though still 10.4 % above the preceding quinquennial mean. The total crop of the countries for which data are at present available, which made up nine-tenths of the world production in 1929, is 5.4 % below that of last year but 8.7 % above the mean.

* *

France : The results of the 1930 season are compared in the following table with those of previous years.

		1930	1929	Average 1924-28	Percentages 1929 = 100	Aver. = 100
Area	(1000 acres)	3,491	3,644	3,637	95.8	96.0
Production	(1000 cent.)	296,060	366,368	310,732	80.8	95.3
	(1000 bush.)	493,423	610,601	517,877		
Yield	(cent. per acre)	84.8	100.5	85.4	84.2	97.3
	(bush. per acre)	141.3	167.6	142.4		

Yields are thus about average, and the slight decrease in production is due rather to the decrease in area.

Great Britain and Northern Ireland : Production in Northern Ireland for 1930 is estimated at 19,184,000 centals (31,974,000 bushels) a decrease of 23.8 % on the production of 1929 and of 18.8 % on the mean of 1924-25.

In Scotland reports are on the whole disappointing, complaints of disease and rot being received from many areas ; second early varieties are especially affected.

In England and Wales the stocks still on farms on 1 January 1931 amounted to 1,346,000 tons (49 % of the 1930 crop) as compared with 2,098,000 tons (58 % of the 1929 crop) on the corresponding date last year, when, following on an exceptionally good crop the stocks were unusually high.

Uruguay : Announcement was made that more than 3,000 tons of choice seed potatoes had already been distributed to farmers throughout the Republic by the Official Seed Commission for the season 1930-31. This seed, which is being sold at reasonable prices in order to encourage production, is transported to purchasers free of charge by the Central Railway.

SUGAR SEASON

In the table of cane-sugar production here published all producing countries are not included. The countries for which it has not been possible to obtain sufficiently exact data are excluded, but those here considered account for about 95 % of the total and afford a general idea of the season's prospects.

There is an increase in cane-sugar production with respect to last season in Asia and Africa ; in Oceania production remains practically the same ; in America there is a marked decrease. The increase in Asia is due mainly to British India, where, with the increase in area cultivated to cane and with favourable weather conditions, production has exceeded that of 1929-30 by 15 %. The increase in Japan is also important ; that in Java is smaller. In Africa, too, production is greater, due to the Union of South Africa where production has increased by one-third as compared with 1929-30.

The marked decrease in the estimates for America is the chief cause of that in the world total, and depends in great part on the restrictions imposed in Cuba. That country will, indeed, carry the greater part of the sacrifices necessitated by the present crisis. Excluding Cuba, the total American production will be 63,881,000 centals (3,218,940 short tons), that is, 97 % of the 1929-30 total, and world production will be 286,086,000 centals (14,328,600 short tons), an increase of 3.0 % on last season.

As regards beet-sugar, the most important modification in the estimates published in the Bulletin for January is in regard to France and in all these modifications raise the increase in European beet-sugar production from 14 % to 15 %.

Production of Cane Sugar.

COUNTRY	1930-31 (1)	1929-30	Average 1924-25 to 1928-29	1930-31 (1)	1929-30	Average 1924-25 to 1928-29	Percentages for 1930-31	
	Thousand centals			Short tons			1929-30 = 100	Average = 100
AMERICA.								
Argentina	8,412	7,506	8,406	420,590	375,310	420,300	112.0	100.0
Brazil	11,244	13,217	16,786	560,000	660,800	839,810	85.0	67.0
Cuba	74,957	104,630	106,750	3,700,000	5,231,437	5,337,420	72.0	70.0
Ecuador	430	420	431	21,500	21,008	21,500	102.0	100.0
United States (Louisiana)	4,157	3,092	1,911	207,850	199,609	95,575	104.0	217.0
Jamaica	1,389	1,449	1,242	69,000	72,460	82,103	96.0	112.0
Mexico	5,401	4,713	4,111	270,000	235,700	205,590	115.0	131.0
Peru	9,250	9,908	7,518	480,000	465,405	375,910	99.0	123.0
Porto Rico	15,432	17,322	12,907	800,000	886,100	645,330	89.0	120.0
Dominican Republic	8,157	8,070	7,580	410,000	403,490	379,000	101.0	108.0
<i>Total, America</i>	<i>138,838</i>	<i>170,627</i>	<i>167,642</i>	<i>6,918,940</i>	<i>8,531,319</i>	<i>8,382,038</i>	<i>81.0</i>	<i>83.0</i>
ASIA.								
Formosa	17,506	17,898	12,160	875,263	893,396	608,450	98.0	144.0
India	71,187	61,816	65,901	3,559,400	3,092,300	3,295,000	115.0	108.0
Japan	2,641	2,318	2,108	132,100	115,609	109,920	114.0	120.0
Java	65,455	64,838	51,086	3,272,681	3,241,864	2,554,208	101.0	128.0
Philippine Is.	17,417	17,858	15,587	870,000	890,000	779,000	98.0	112.0
<i>Total, Asia</i>	<i>174,206</i>	<i>164,728</i>	<i>146,941</i>	<i>8,709,444</i>	<i>8,233,469</i>	<i>7,346,638</i>	<i>106.0</i>	<i>119.0</i>
AFRICA.								
Egypt	2,370	2,368	2,019	118,500	118,402	101,000	100.0	117.0
Mauritius	4,900	5,248	4,982	248,000	262,386	249,100	95.0	100.0
Reunion	1,102	1,117	1,122	60,000	55,854	56,100	99.0	98.0
Union of S. Africa	7,800	5,973	4,748	390,000	298,632	237,890	131.0	164.0
<i>Total, Africa</i>	<i>16,332</i>	<i>14,706</i>	<i>12,871</i>	<i>816,500</i>	<i>735,274</i>	<i>643,590</i>	<i>109.0</i>	<i>124.0</i>
OCEANIA.								
Australia	11,813	11,883	10,843	591,000	594,000	542,000	99.0	109.0
Hawaii	18,298	18,320	16,746	910,000	916,000	837,300	100.0	109.0
Fiji Is.	1,905	1,971	1,895	95,200	98,500	94,730	97.0	101.0
<i>Total, Oceania</i>	<i>32,016</i>	<i>32,174</i>	<i>29,484</i>	<i>1,596,200</i>	<i>1,608,500</i>	<i>1,474,030</i>	<i>100.0</i>	<i>109.0</i>
General Totals	361,292	382,233	356,938	18,641,684	19,168,562	17,846,296	95.0	101.0

(1) Approximate data.

France: In the following table the results of the 1930 season are compared with those of the preceding years.

		1930	1929	Aver. 1924-28	Percentages 1929 = 100	Aver. = 100
Area	(1000 acres)	646	607	563	106.4	114.7
Production	(1000 centals)	194,329	118,202	119,143	164.4	163.1
	(1000 sh. tons)	9,716	5,910	5,957		
Yield	(centals per acre)	300.8	194.7	211.6	153.2	140.9
	(sh. tons per acre)	15.0	9.7	10.6		

India : The final estimate of the area under sugar cane in 1930-31 is 2,777,000 acres compared with 2,515,000 the previous year and 2,732,000, the average of 1924-25¹ to 1928-29 ; percentages : 110.4 and 101.6.

Planting of sugar cane in Bengal progressed favourably during January.

Indo-China : In Annam and Cochin-China the growth of autumn² cane was good.

Palestine : Crop is being harvested.

Egypt : During December and January weather was warmer than usual and therefore very favourable to an advanced maturity and harvesting of crop. Cutting for local consumption and for native producers of molasses was in progress, as also for supply to sugar factories. The Kom-Ombo sugar factory started work on December 18th, and the other factories some time after. Yield is above the average by 2 %. Preparation of land for the oncoming crop is going on.

The crop condition of sugar cane on February 1 was 102, against 103 on January 1, 1931 and 102 on February 1, 1930.

Union of South Africa : All South Coast mills had completed the 1930-31 campaign by the end of December. Crop condition in December was 5 % below normal. Rain-fall was somewhat irregular, ranging from 2.48 inches in Zululand to 6.04 inches on the South Coast.

Australia. (Telegram of 13 February) : Beneficial rains have fallen and, with continuance of favourable growing conditions, the crop will be satisfactory.

VINES

The Wine Trade Situation in the Producing Countries of Central and Eastern Europe at the benning of the 1930-31 season.

The following survey of the market situation in the wine-producing countries of Central and Eastern Europe is a continuation of last month's study. It must be pointed out that no study of this subject can give very precise results owing to the almost complete absence of data concerning actual internal consumption and end-of-season stocks.

Greece : Though not one of the more important producers Greece takes third place amongst countries supplying the world-market. In recent years it has exported 40-50 % of its total production.

The above table shows that from 1925-26 inclusive there has been (1) a growth of the export trade ; (2) a fairly close relation between variations in export and in production. It is notable that in 1928-29, with a production of over 2,860,000 Imperial gallons (3,430,000 American gallons) or about two-thirds of the 1924-25 production the apparent consumption has increased by only 4,620,000 Imperial gallons (5,550,000 American gallons) or 13.3 %. It must, however, be borne in mind that the 1930 production is only 5,169,000 Imperial gallons (6,208,000 American gallons) greater than the lowest figure of apparent consumption since the war and that real internal consumption was, even in 1925-26 very probably over 22 million Imperial gallons (26 million American gallons). To maintain exports at last year's level it would therefore be necessary for

TABLE I. — *Apparent Consumption and Export of Greek Wines.*

Season : Oct.-30 Sept.	1930-31	1929-30	1928-29	1927-28	1926-27	1925-26	1924-25	1923-24
(Thousand Imperial gallons).								
Previous production . . .	26,111	47,361	67,642	49,934	59,217	41,773	40,305	39,112
Exports for the season (1) . . .	...	20,084	29,609	23,801	33,458	20,832	10,163	5,097
Apparent consumption (2) . . .	...	27,277	38,034	26,133	25,759	20,942	30,186	33,414
Exports 1 Oct.-30 Dec. (1) . . .	(3) 4,180	10,119	9,107	5,631	8,557	5,939	2,640	792
(Thousand American gallons).								
Previous production . . .	31,357	56,876	81,233	59,967	71,115	50,166	55,608	46,970
Exports for the season (1) . . .	...	24,119	35,557	28,583	40,180	25,017	12,265	6,842
Apparent consumption (2) . . .	...	32,757	45,675	31,383	30,934	25,149	43,456	40,128
Exports 1 Oct.-30 Dec. (1) . . .	(3) 5,019	12,152	10,937	6,763	10,276	7,133	3,170	951

(1) Export of wine and must. — (2) No account taken in the total of imports, which vary from 20,458 Imperial gall. (24,568 Amer. gall.) to 50,594 Imp. gall. (60,759 Amer. gall.). — (3) For December figures for export of must are lacking; this amounted to 213,816 Imp. gall. (256,774 Amer. gall.) in 1929, 22,459 (26,972) in 1928.

available supplies to attain 15,400,000 Imperial gallons (18,500,000 American gallons), which seems very unlikely. A reduction in internal consumption and also a rather marked diminution in exports may, accordingly, be anticipated. The aspect of the market in the first three months of the season seems to confirm this conclusion, despite the efforts of the Government and the trade to stimulate the movement of Greek wines on foreign markets. Besides, of the two chief buyers of Greek wines, France is likely in coming months to supply its needs less and less on foreign markets and Germany has an abundant crop.

Hungary : In contrast to Greece, Hungary exports only a small part of its production, scarcely one-tenth on the average of the last two years.

TABLE II. — *Internal consumption and export of Hungarian wines.*

Season October 1-September 30	1930-31	1929-30	1928-29	1927-28	1926-27	1925-26	1924-25	1923-24
(Thousand Imperial gallons).								
Production of wine (1) . . .	75,232	48,417	61,043	36,164	25,825	68,126	26,091	91,862
Export of wine . . .	...	6,731	5,455	1,496	594	902	204	2,750
Apparent consumption . . .	...	41,487	55,412	34,712	25,055	67,247	26,793	89,156
Real consumption (2) . . .	...	—	—	41,289	37,858	49,275	68,500	73,186
(Thousand American gallons).								
Production of wine (1) . . .	90,346	58,144	73,307	43,430	31,014	81,814	32,414	110,318
Export of wine . . .	...	8,084	6,551	1,796	713	1,083	317	3,302
Apparent consumption . . .	...	49,823	66,545	41,686	30,080	80,757	32,176	107,008
Real consumption (2) . . .	...	—	—	49,585	45,464	59,174	82,203	87,890

(1) Calculated on the basis of 9/10 of the production of must, — (2) Account taken of stocks at the beginning and end of the season.

The above table shows a very considerable increase in exports in the last two years. The figures for apparent consumption are also given and those of real consumption up to 1927-28, which also show fairly marked variations.

If by normal consumption is understood that which exactly absorbs an average production, neither too poor nor too heavy, then the consumption for the period 1 October

1922 to 30 September 1925 may be considered as such ; in fact the average production was 70,062,000 Imperial gallons (84,138,000 American gallons), stocks remaining on 30 September 1925 were almost equal to those on 1 October 1922 — 4,400,000 Imperial gallons (5,300,000 American gallons) as against 5,500,000 (6,600,000) — real consumption was fairly constant and equal to the average production — 71,490,000 Imperial gallons (85,860,000 American gallons) in 1922-23, 73,186,000 (87,890,000) in 1923-24 and 68,500,000 (82,263,000) in 1924-25, in spite of the very poor crop of 1924.

When it is remembered, on the other hand, that the 1928-29 season began with stocks almost nil, consumption in the two seasons 1928-29 and 1929-30 ought to have absorbed almost the entire quantity supplied by the two crops 1928 and 1929 — on the average 55.0 million Imperial gallons (66.0 million American gallons). This permits it to be assumed that on 1 October 1931 there remained little stocks from previous crops and that only supplies from the 1930 crop will be available in 1930-31. These supplies appear to be on the whole sufficient for the needs of the export trade now being developed, which are not, however, likely to exceed 7,700,000-8,800,000 Imperial gallons (9,250,000-10,600,000 American gallons) and those of internal consumption, which may be taken as not above 66 million Imperial gallons (79 million American gallons).

It should be noted that the Hungarian Government has taken steps to facilitate the movement of national wines, particularly by means of bounties on export.

Yugoslavia : The participation of Yugoslavia in international trade is small, as may be observed from the following table.

TABLE III. — *Production and export of Yugoslav wines.*

	1931	1930	1929	1928	1927	1926	1925	1924
	(Thousand Imperial gallons)							
Production of preceding autumn	87,990	63,991	94,085	62,803	64,057	90,124	64,189	97,097
Exports . . . . .	...	2,728	1,232	1,254	2,024	528	242	330
	(Thousand American gallons)							
Production of preceding autumn	105,668	76,847	114,060	75,421	76,927	108,281	77,085	116,805
Exports . . . . .	...	3,276	1,479	1,506	2,430	634	291	396

(1) Provisional estimate.

It seems therefore, that nearly the whole of the home production is normally absorbed for internal consumption. According to an estimate published in the Commercial Bulletin of the Foreign Trade Office, the average annual consumption, is 55.0 million Imperial gallons (66.0 million American gallons).

Even estimating that this figure is too low and taking into account the quantities distilled or lost, there still certainly remained very abundant stocks at the beginning of the season 1930-31 and as home consumption seems to be hardly sufficient to absorb the crops of the worst years so far recorded, the stocks carried over from year to year cannot but increase.

The efforts of the Government to develop home consumption on the one hand, and exports by granting special export bounties on the other can have no immediate effect.

Yugoslavia has, therefore, a very serious crisis of overproduction ; the prices on the home wine markets, moreover, are amongst the lowest quoted.

Bulgaria : Although for this country data as complete as that of Yugoslavia are not available, there is every indication that a similar situation exists. In fact, the export trade, which started in 1925 and has been subject to large variations, is insignificant compared with the production ; further, the constant growth of production could not have been accompanied by a corresponding development in home consumption as the latter would have had to be tripled in six years. These facts lead to the supposition that the supplies for the season 1930-31 are much above requirements for consumption and that Bulgaria has a crisis of overproduction of wine.

TABLE IV. — *Production and Export of wine in Bulgaria and Rumania.*

	1931	1930	1929	1928	1927	1926	1925	1924
<i>Bulgaria.</i>	(Thousand Imperial gallons)							
Production of preceding autumn	57,744	50,858	37,682	33,612	33,568	25,363	21,096	16,916
Exports . . . . .	...	—	88	794	1,254	(1)	(1)	(2)
<i>Rumania.</i>	(Thousand American gallons)							
Production of preceding autumn	60,346	61,076	45,252	40,365	40,312	30,450	25,334	20,315
Exports . . . . .	...	—	106	845	1,506	(1)	(1)	(2)
<i>Bulgaria.</i>	(Thousand Imperial gallons)							
Production of preceding autumn	183,548	112,000	156,777	156,205	111,418	166,861	134,493	—
Exports . . . . .	...	—	—	154	484	154	352	154
<i>Rumania.</i>	(Thousand American gallons)							
Production of preceding autumn	220,424	133,301	188,275	187,588	133,803	200,374	161,514	—
Exports . . . . .	...	—	—	185	581	185	423	185

(1) Export almost nil: 286, 286 and 44 Imperial gallons (343, 343 and 53 American gallons).

Rumania : The situation of Rumania on the wine market is characterised, in the same way as for the preceding two countries, by a very small export trade relative to production.

No precise knowledge is possessed of real consumption and the situation of stock but general information reveals a crisis due to the fact that consumption is smaller than production ; two years ago, the Government took vigorous steps to forbid the cultivation of ungrafted hybrid plants in order to avoid a growth of overproduction. There is every reason, therefore, to suppose that the present season opened with still unexhausted stocks carried over from previous production ; as this season's production is exceptionally abundant, it cannot fail to end with heavy stocks on hand.

Rumania is therefore also experiencing a crisis of overproduction of wine, the gravity of which it is difficult to judge.

Central Europe : The countries of Central Europe — Germany, Switzerland, Czechoslovakia and Austria — have in varying degrees an average production inadequate to meet their requirements. If exception is made of Germany, whose wine exports show constant increase, the other countries market abroad only negligible quantities of their production.

As is shown by the above table, production this year is exceptionally abundant except in Switzerland, where it is average. It must be noted that wine imports into each of these countries show a clear tendency to decrease. If it is considered, moreover, that production this year equals the apparent consumption of last year in Germany and

TABLE V. — *Production and foreign trade of wines in Central Europe.*

	1931	1930	1929	1928	1927	1926	1925	1924
<i>Germany.</i>								
	(Thousand Imperial gallons).							
Production of the preceding autumn	61,813	44,413	45,161	31,413	21,756	34,998	39,684	17,400
Imports	...	18,258	25,385	30,116	25,495	15,200	28,839	14,320
Exports	...	1,584	1,078	960	770	792	814	374
<i>Switzerland.</i>								
Production of the preceding autumn	14,078	17,568	14,518	7,163	10,009	12,099	8,359	18,544
Imports	...	26,243	26,155	27,233	26,529	32,006	32,006	32,248
Exports	...	—	44.0	41.8	44.0	35.2	28.6	55.0
<i>Austria.</i>								
Production of the preceding autumn	21,580	12,605	17,048	4,971	10,163	18,918	6,709	18,082
Imports	...	8,205	9,041	10,603	9,437	7,215	7,039	8,709
Exports	...	—	17.6	17.6	17.6	11.0	39.6	444.4
<i>Czechoslovakia.</i>								
Production of the preceding autumn	9,481	4,927	7,105	2,332	3,080	6,885	5,763	7,250
Imports	...	(1)	6,467	6,533	6,093	4,663	5,719	5,675
Exports	...	—	13.2	6.6	4.4	4.4	4.4	2.2
<i>Germany.</i>								
	(Thousand American gallons).							
Production of the preceding autumn	74,232	53,336	54,234	37,724	26,126	42,030	47,656	20,896
Imports	...	21,926	30,485	36,165	30,617	18,254	34,633	17,198
Exports	...	1,902	1,204	1,189	925	951	977	449
<i>Switzerland.</i>								
Production of the preceding autumn	16,907	21,134	17,435	8,638	12,020	14,529	10,038	22,270
Imports	...	31,516	31,410	32,704	31,860	38,437	38,437	38,727
Exports	...	—	52.8	50.2	52.8	42.3	34.2	66.0
<i>Austria.</i>								
Production of the preceding autumn	25,915	13,137	20,473	5,970	12,255	22,710	8,057	21,715
Imports	...	9,854	10,857	12,733	11,333	8,665	8,453	10,567
Exports	...	—	21.1	21.1	21.1	13.2	47.6	533.6
<i>Czechoslovakia.</i>								
Production of the preceding autumn	11,386	5,917	8,533	2,800	3,698	8,269	6,921	8,718
Imports	...	(1)	7,767	7,846	7,318	5,600	6,868	6,816
Exports	...	—	15.9	7.9	5.3	5.3	5.3	2.6

(1) Imports January 1-October 31: 4,641,483 Imperial gallons (5,574,004 American gallons) against 5,081,434 (6,102,345) in 1929.

exceeds it in Austria, that in both countries it is above the average annual consumption of the previous five years and that it approaches the latter in Czechoslovakia and, further, that the economic crisis cannot fail to reduce internal consumption, it is certain that these four Central European countries will only absorb a reduced quantity of foreign wines.

Conclusion : If exception is made, on the one hand, of Greece, which is being obliged by low production to reduce its exports and lose part of its clientele and, on the other hand, of Hungary, all the countries of Eastern and Central Europe at the beginning of the season 1930-31 had exceptionally heavy stocks, which are contributing to a serious crisis of overproduction in the exporting countries and represent a growing obstacle on the markets of the other countries to the import of foreign wines.

As a general conclusion for the whole of the wine producing countries of the northern hemisphere it may be said : firstly, that the large producing countries of Western Europe, despite a low production, offset, however, by the North African production and high stocks from previous seasons, have adequate supplies for their home consumption and export trade ; and secondly, that in the remaining wine producing countries of Europe, there is general overproduction.

Although the production of 1930 was exceptionally low, it will certainly not be possible for the whole of the surplus from previous production now on the world market to be absorbed in the season 1930-31.

* * *

Austria : Crop condition of vines on February 1 was 2.1 against 1.8 on January 1 of this year and 2.5 on February 1, 1930.

Italy : The final figures for area of vines and production of grapes and wine in 1930 compared with the data for 1929 and the average of 1924-28 are as follows :

	1930	1929	Average 1924-28	Percentages 1929 = 100	Average = 100
	---	---	---	---	---
<i>Area :</i>					
Mixed crop (1000 acres) . .	8,584	8,666	8,486	99.1	101.2
Simple crop (1000 acres) . .	1,939	1,945	2,100	99.7	92.4
<i>Production of grapes :</i>					
Mixed crop (1000 centals)	73,388	77,195	85,009	95.1	86.3
Simple crop (1000 centals)	55,722	64,779	62,832	86.0	88.7
Total	129,110	141,974	147,841	90.9	87.3
<i>Production of wine :</i>					
(1000 Imperial gallons) . .	798,903	902,997	922,268	88.5	86.6
(1000 American gallons) . .	959,411	1,084,418	1,107,560		

OLIVES

Palestine : Picking has been concluded in the Southern Circle, and in northern areas pressing is in progress. Picked olives are fetching good prices. Crop condition on February 1 was good.

Algeria : Below are given the latest estimates of production of olives and oil :

	1930-31	1929-30	Average 1924-25 to 1928-29	Percentages 1929-30 = 100	Average = 100
	---	---	---	---	---
		(thousands)			
Olives (centals)	2,108	3,792	3,470	56.6	60.7
Olive oil (centals)	254	505	474	50.4	53.7
(Am. gallons)	3,344	6,634	6,231		

While this month's estimate for olives is slightly higher, that for oil is considerably lower ; the yield of oil from olives therefore appears to be poor. It is known that the

drought which persisted until the beginning of January and the *Dacus oleae* were the largest factors contributing to the poor production.

Tripolitania : Crop condition on 1 January was 100 ; weather is favourable, precipitation being almost everywhere normal.

Tunis : The estimates of extremely poor production published in December have been confirmed by the harvest. To the effects of the drought has been added the damage caused by olive fly. On the other hand, crop condition, which was bad in November (50), became good (100) as a consequence of the abundant rains of December-January and on 1 January 1931 was excellent.

COTTON

Brazil : Picking in São Paulo, favoured by the weather, has been completed.

St. Vincent : Condition of cotton remained very promising during the last three months of 1930. Insect attacks have been very limited and have not caused any notable damage. Towards the end of the year harvesting had begun.

India : According to the final report the area under cotton in the Punjab in 1930-31 was 2,491,000 acres, against 2,496,000 in 1929-30 and 2,659,000, the average of 1924-25 to 1928-29; percentages: 99.8 and 93.7. The corresponding productions are 3,064,000 centals (641,000 bales); 3,108,000 (650,000) and 2,896,000 (606,000); percentages: 98.6 and 105.8. The figures for Madras are as follows : Area : 2,075,000 acres; 2,467,000 acres; 2,513,000 acres; percentages 84.1 and 82.6. Production: 1,670,000 centals (349,000 bales); 2,050,000 (429,000) and 1,978,000 (414,000); percentages 81.5 and 84.4. Crop condition in Madras is estimated at 96 % of the normal.

Indo-China : In Cambodia it is reported that numerous fields planted to cotton have been flooded by the first autumn rains. In Annam, these rains were beneficial to the crops although encouraging the growth of weeds.

Algeria : Recent heavy rains have hindered final harvest operations. In some plantations grave damage has been caused and crops destroyed by *Eudemis botrana*.

As a result, the estimates for the present month, of both area harvested and production, are below those of last month.

	1930-31	1929-30	Average 1924-25 to 1928-29	Percentages 1929-30 = 100	Aver. = 100
Area harvested (acres)	14,600	14,000	13,400	104.4	109.0
Production gin- ned cotton (centals)	29,500	36,700	22,600	80.6	130.9
(bales)	6,200	7,700	4,700		
Cottonseed (centals)	57,000	68,000	—	83.2	—
(sh. tons)	2,800	3,400	—	—	—

Egypt : Ploughing of fallow land consigned to the cotton crop is in progress. Some areas of catch crop bersim are also being ploughed. In Middle Egypt and the Southern part of the Delta, farm-yard manure has been administered to the land prior to the first ploughing in preparation to the sowing of the crop. (Telegram of February 14): Cotton ginnings from the beginning of the season 1930-31 to January 31 amount to 5,289,000 centals (1,107,000 bales) of which 1,292,000 (270,000) of Sakellaridis and 3,997,000 (836,000) of other varieties. In addition 127,000 centals (26,600 bales) of linters have been obtained. Figures for the corresponding period of the previous year are 5,955,000 (1,246,000) ; 1,794,000 (375,000) ; 4,161,000 (870,000) 137,000 (28,700).

Eritrea : The harvest, which has now been begun, is reported as normal ; in some districts, however, the crop has been damaged by insects. The area sown in 1930-31 is 6,900 acres, 12 % above that of last season, 6,200 acres.

Anglo-Egyptian Sudan : According to the most recent estimate production in 1930-31 is 634,000 centals (133,000 bushels) against 665,000 (139,000) in 1929-30 and 507,000 (106,000) in the preceding quinquennium. Percentages 95.3 and 125.1.

FLAX

France : In the following the linseed production for 1930 is compared with that of preceding years :

	1930	1929	Average 1924-28	Percentage s	
				1929 = 100	Aver. = 100
Area (1000 acres)	74	86	64	85.9	116.1
<i>Production :</i>					
Linseed (1000 cent)	414	332	314	124.8	132.0
(1000 bush.)	740	593	561		
Fibre (1000 cent.)	604	563	482	107.2	125.3
(1000 lb.)	60,357	56,304	48,182		
<i>Yield per acre :</i>					
Linseed (cent.)	5.6	3.9	4.9	145.8	114.4
(bush.)	10.0	6.9	8.8		
Fibre (cent.)	8.1	6.5	7.5	124.7	108.3
(lb.)	812.5	654.7	752.8		

Yield of linseed is this year very high. The sharp reduction of area after the steady growth of post-war years is notable.

Great Britain and Northern Ireland : In Northern Ireland production of flax in 1930 is estimated at 119,800 centals (11,984,000 bushels) a decrease of 22.6 % on the 1929 production and of 6.3 % on the 1924-28 average. The respective decreases in area

for 1930 were 15.9 % and 18.4 %, so that the yield per acre in 1930 has been smaller than in 1929 though higher than in the five-year period. As present prices, practically only half those of the last season, are regarded as quite unprofitable to the farmer it is expected that a further reduction in area will occur in 1931.

Argentina. (Telegram of February 15) : The second estimate of production of linseed in Argentina is 38,581,000 centals (68,895,000 bushels) against the estimate of 47,269,000 (84,409,000) made in December, 28,003,000 (50,005,000) in 1929-30 and 40,548,000 (72,407,000), the average of the preceding five seasons. The reduction of 12.27 % compared with the December estimate is due principally to frequent rainfall which caused damage to crops in the last period of ripening and during harvest operations. Percentage comparisons with 1929-30 and the average are 137.8 and 95.1 respectively.

India : Apart from light local showers, practically no rain fell during January in Bihar and Orissa ; flax crops are in good condition. In the Central Provinces light to moderate rains at the end of January were of benefit to crops ; there was also some hail which, however, caused very little damage. In the United Provinces local damage to crops is reported due to insects, frost and want of rain but at the end of January crops were doing well.

Palestine : Crop is developing well under favourable conditions.

Egypt : Weather conditions in January have been favourable to growth, which is satisfactory. Manuring some areas with nitrogenous manures, watering from artesian wells and weeding are all in progress. Flowering started in early-sown areas. No pests seen.

OTHER PRODUCTS

Tea.

India : In North India, weather conditions during December last may be described as having been normal for the time of the year and little leaf was plucked. In South India, the usual cold weather conditions prevailed throughout that month and crop prospects may be described as fair.

The preliminary returns of the final figures of production in North India to the end of December record a crop for the season of 329 million lbs., the decrease being over 42 ½ million lbs.

Compared with the preceding year. In South India, the crop to the end of last season showed a decrease of over 7 % as compared with that for the preceding year.

Kenya : The area under tea in 1930 was 8,300 against 5,600 in 1929 and 3,200 on the average of the three years 1926-28 (149 % and 259 %). Production was 577,800 lbs. against 152,800 in 1929 and 15,100 in the preceding three years (378 % and 3,829 %).

Coffee.

Indo-China : Growth was good in Annam and Laos but damage due to *Corticium salmonicolor* was accentuated in Annam during the autumn. A good crop is, however, expected.

Eritrea : In the current season coffee is being cultivated on an area of about 250 acres. Picking will take place in May. The plantations are suffering from the exceptional drought.

Kenya : The coffee area for 1930-31 is estimated at 99,000 acres against 90,000 in 1929-30 and 71,000, the average for the preceding five years ; percentages : 109.6 and 140.1. Production is estimated at 287,000 centals against 261,000 in 1929-30 and 181,000 the five year average ; percentages : 110.1 and 158.4.

Cacao.

Gold Coast : The harvest was completed in January. The dry spell allowed sun-drying of the stored beans to become general. The determination to hold for a better price continued until the first half of January, when it was decided to market part of the crop. In some localities marketing became normal, the crop moving freely, in others the quantity offered was smaller than usual. This attitude continued for two weeks. In the meantime the weakening of prices, with a downward tendency toward the end of January, hastened the decision to realise, and free movement of the crop became general. Quality is unexpectedly good, being generally rather above the average. Care appears to have been given to drying and storing since the percentages of mould and weevil are not above the normal. Crop movement from 11 January was abnormal, exceeding the previous record for the period. Shipments by steamer in October-January amounted to 66,000 long tons (1,478,400 centals) against 119,000 (2,665,600) the average for the last four years, and in January alone 26,000 long tons (582,400 centals) against 38,000 (851,200), the four year average for the same month. The quantity arriving by rail at Takoradi and Accra in October-January was 16,756 long tons (375,334 centals) and 43,000 long tons (963,200 centals) respectively, against averages for the last four years of 50,000 long tons (1,120,000 centals) and 55,000 long tons (1,232,000 centals). The quantity arriving by rail at the same ports during January was 13,691 long tons (306,678 centals) and 16,528 (370,227) against 13,440 (301,056) and 15,753 (352,867) in the four-year period.

Rapeseed, Sesamum and Coconuts.

Austria : On 1 February crop condition of colza was 2.5 against 2.6 on 1 January of this year and 2.9 on 1 February 1930.

India : Apart from light local showers, practically no rain fell during January in Bengal and harvesting progressed favourably ; condition of standing crops was fair at the end of January. In the Punjab, except for scattered light rains during last month, the weather was dry and at the beginning of February rain was badly needed. Condition and prospects of crops was average to good on irrigated areas and below the average to average on unirrigated areas. Rapeseed has been damaged by insects in Gurgaon and parts of the districts of Hissar and Rohtak.

Indochina : In Annam, production has been good, a yield of 100 lbs of oil having been obtained from 800 lbs. of nuts.

Tobacco.

United States : Seeding tobacco beds showed good progress at the end of January.

France : Area and production of hemp in 1930 compared with the figures for previous years are as follows :

	1930	1929	Average 1924-28	Percentages 1929 = 100	Average = 100
	—	—	—	—	—
Area (acres).	10,200	11,400	12,200	89.0	83.6
Production (centals) :					
Seed	15,900	20,400	36,100	77.9	43.9
Fibre	104,300	109,200	105,200	95.5	99.2

Both the area and production of seed have decreased but the production of fibre is satisfactory.

Hops.

France : Production is very poor, 64,000 centals against 154,200 last year and the five-year mean of 102,800. Percentages 41.5 and 62.2.

Sericulture.

Indo-China : In Annam the first rains of autumn considerably hindered rearings, which have had to be interrupted definitely.

Japan : According to the most recent estimate production of spring cocoons in 1930 amounted to 463,825,000 lbs. or 110.9 % of that of the previous year and 126.2 % of the average of the preceding five years ; production of summer-autumn cocoons was 416,356,000 lbs. (97.8 % and 121.2 %).

TOTALS OF WORLD AGRICULTURAL PRODUCTION

The following totals have been obtained from the data in the tables published for each product in January, which have been revised and completed. With the name of each product is indicated the number of countries for which data for 1930 are at present available and also the percentage of their total production in 1929 to world production in the same year as published in the 1929-30 Yearbook, when they comprised nearly all producing countries except China.

Crop, number of countries comprised in the total, and percentages of world production	AREA					PRODUCTION									
	1930 and 1930-31	1929 and 1929-30	Average 1924 to 1928 and 1924-25 to 1928-29	Percentages for 1930 and 1930-31		BRITISH WEIGHTS			AMERICAN WEIGHTS			Percentages for 1930 and 1930-31			
				1929 and 1930 = 100	Aver- age = 100	1930 and 1930-31	1929 and 1929-30	Average 1924 to 1928 and 1924-25 to 1928-29	1930 and 1930-31	1929 and 1929-30	Average 1924 to 1928 and 1924-25 to 1928-29	1929 and 1929- 1930 = 100	Aver- age = 100		
	thousand acres			%	%	thousand centials							%	%	
Wheat (46 countr. 99.0 % a)	224,865	238,038	228,811	102.0	107.0	2,206,985	2,046,128	2,000,860	thousand bushels (60 pounds)					107.9	105.6
Rye (29 countries 100.0 % a)	48,616	47,282	46,862	102.8	103.7	557,430	562,533	497,713	thousand bushels (56 pounds)					99.2	112.1
Barley (41 countr. 92.0 % a)	60,935	62,667	53,956	97.2	112.9	601,634	720,103	508,288	thousand bushels (48 pounds)					96.0	115.6
Oats (36 countries 97.0 % a)	102,023	101,600	103,633	101.3	99.3	1,150,656	1,174,589	1,155,971	thousand bushels (36 pounds)					98.0	99.5
Maize (19 countries 79.0 % a)	137,136	135,092	135,448	101.5	101.2	1,521,003	1,892,404	1,809,257	thousand bushels (56 pounds)					80.4	81.4
Rice (rough) (9 countr. 27.0 % . . . a)	27,708	26,544	26,404	104.4	104.9	506,070	518,039	520,951	thousand bushels (43 pounds)					115.0	112.6
Potatoes (31 countr. 94.0 % a)	20,485	20,841	20,946	98.8	101.9	3,066,901	3,272,110	2,849,762	thousand short tons					94.6	108.7
Sugar- beet { 19 countr. a) 20 countries 100.0 % b)	5,026 7,550	4,614 6,504	4,586 6,012	108.9 116.2	109.6 125.7	1,244,836 1,553,484	992,344 1,131,235	998,012 1,171,593	thousand short tons					125.4 137.3	124.7 182.6
Cotton seed { 10 countr. a) 11 countries 93.0 % b)	71,817 75,586	73,851 76,411	72,917 74,610	97.2 98.9	98.5 101.3	97,162 106,973	100,946 107,202	104,217 108,505	thousand bushels (56 pounds)					96.3 99.8	98.2 98.6
Linseed (16 countr. 93.0 % a)	15,301	12,528	14,251	122.1	107.4	65,528	49,084	69,616	thousand pounds					133.5	94.1
Flax (fibre) (14 countr. 66.0 % . . . a)	692	756	736	91.5	94.0	2,910	3,397	3,422	thousand pounds					85.7	95.1
Hemp (fibre) (6 countr. 50.0 % . . . a)	267	279	282	95.6	94.9	2,370	2,357	2,577	thousand pounds					100.6	92.0
Tobacco (12 coun- tries 75.0 % . . . a)	2,980	2,889	2,560	103.2	116.4	24,989	23,832	22,408	thousand pounds					104.9	111.5
Hops (6 countries 89.0 % a)	126	143	126	87.9	100.0	1,100	1,493	1,155	thousand pounds					73.7	95.2
Olive oil (5 coun- try 70.0 %)	—	—	—	—	—	5,401	18,356	10,750	thousand pounds					29.4	50.2
Vines (14 c. 87.0 %)	—	—	—	—	—	(1)2,755,833 (1)3,425,832 (1)3,157,858	(1)2,755,833 (1)3,425,832 (1)3,157,858	(1)3,309,532 (1)4,114,117 (1)3,702,804	thousand gallons					80.4	87.2
Silk (6 c. 99.0 %)	(2) 7,619 (2) 7,834 (2) 7,893	(2) 7,619 (2) 7,834 (2) 7,893	(2) 7,619 (2) 7,834 (2) 7,893	97.3	103.1	(3)1,052,259 (3)1,013,720 (3) 861,856	(3)1,052,259 (3)1,013,720 (3) 861,856	(3)1,052,259 (3)1,013,720 (3) 861,856	thousand pounds					103.8	122.1

a) Not including the U. S. S. R. - b) Including the U. S. S. R. - (1) Wine. - (2) Eggs in incubation. - (3) Cocoons.

FODDER CROPS

Austria : Despite the lack of a protective snow cover, fodder crops present a good appearance. Here and there however field mice have caused considerable damage in the clover fields and permanent meadows.

On February 1, conditions of the principal fodder crops were : red clover : 2.5 (against 2.4 on January 1 1931 and 2.5 on February 1, 1930) ; alfalfa ; 3.0 (2.9, 2.7) ; mixed fodder and vetches : 2.5 (2.5, 2.6) ; permanent meadows : 2.5 (2.4, 2.5) and pastures 2.7 (2.8, 2.7).

France : Production of fodder in 1930 compared with preceding years is as follows :

	1930	1929	Average 1924-28	Percentages 1929 = 100	Average = 100
Mangolds (1000 cent.) . . .	687,983	478,487	503,654	143.8	136.6
(1000 sh. tons) . . .	34,399	23,924	25,182		
Annual green (1000 cent.) . .	277,526	216,452	254,053	128.2	109.2
fodder (1000 sh. tons) . .	13,876	10,822	12,702		
Temporary pastures (1000 cent.)	36,120	26,046	29,223	134.0	123.6
(1000 sh. tons)	1,806	1,347	1,461		
Artificial pastures					
(1000 cent.)	282,042	221,158	267,724	127.5	105.3
(1000 sh. tons)	14,102	11,058	13,386		
Permanent meadows.					
(1000 cents)	483,752	340,402	383,691	142.1	126.1
(1000 sh. tons)	24,187	17,020	19,184		
Total (1000 cent.)	1,767,443	1,283,445	1,438,345	137.7	122.9
(1000 sh. tons)	88,370	64,171	71,916		

Though this summary does not include data of fodder and grass for certain districts, it does indicate that fodder production in 1930 was exceptionally abundant, partly through high yields, partly through the greater area devoted to these crops.

Italy : Fodder crops are vigorous and promising.

Italy : In the following table is indicated the production of fodder crops in terms of ordinary hay compared with that of 1929 and the average for 1924-28.

	1930	1929	Average 1924-28	Percentages 1929 = 100	Average = 100
	Thousand centals				
Temporary meadows	255,392	228,296	222,145	111.9	115.0
Grass	40,567	40,183	29,047	101.0	139.7
Unirrigated permanent meadows	83,414	65,493	73,332	127.4	113.7
Irrigated permanent meadows .	49,692	52,322	47,760	95.0	104.0
Permanent pastures	61,074	61,752	60,410	98.9	101.1
Accessory fodder production . .	98,625	101,172	74,823	97.5	131.8
Total	588,764	549,218	507,517	107.2	116.0

	1930	1929	Average 1924-28	Percentages 1929 = 100	Aver. = 100
			Thousand short tons		
Temporary meadows	12,769	11,415	11,107	111.9	115.0
Grass	2,028	2,009	1,452	101.0	139.7
Unirrigated permanent meadows	4,171	3,275	3,667	127.4	113.7
Irrigated permanent meadows .	2,485	2,616	2,388	95.0	104.0
Permanent pastures	3,054	3,088	3,020	98.9	101.1
Accessory fodder production . .	4,931	5,059	3,741	97.5	131.8
Total	29,438	27,461	25,376	107.2	116.0

Canada : The area of maize for fodder in 1930 was 426,000 acres against 423,000 in 1929 and 532,000, the average for the period 1924-28 ; percentages ; 100.7 and 80.0. Production in 1930 is estimated at 69,520,000 centals (3,476,000 short tons) against 66,446,000 (3,322,000) and 91,493,000 (4,575,000) respectively, percentages : 104.6 and 76.0.

Palestine : Bersim is developing favourably. First cut has been made in irrigable land. In the main fields of the colonies winter sown bersim is well above ground.

Egypt : Weather conditions in January have been favourable to bersim crops which benefited by the rainfall in Lower Egypt. Growth is good. Severe cold on some days delayed it a little, particularly in late-sown areas. The taking of the first cutting is on the whole progressing, as also that of the second cutting in early-sown areas in Lower Egypt and in basin lands in Upper Egypt. The taking of the third cutting, however, has been started in early-sown areas in project-lands. Areas of catch-crop bersim have been ploughed in as a preparation for cotton sowing.

Crop condition of bersim on 1 February was 100, as on 1 January of this year, against 99 in February 1930.

French Morocco : Herbage is gradually sprouting but is not yet very plentiful.

Tunis : The rains, which at the beginning of January extended as far as the south of Tunis, have improved the situation of fodder crops and pastures. The crops and temporary meadows promise good yields in the north and centre ; they have suffered much damage from the drought and are not in very good condition. In the south pastures remained inadequate for feeding at the beginning of January but subsequent rainfall brought about a recovery to normal growth.

LIVESTOCK AND DERIVATIVES

The production of butter and cheese in the important non-European countries exporting these products (1).

Countries outside Europe which, in the last decade, have come into the foreground as exporters of butter are New Zealand, Australia, Argentina and Canada and for cheese exports, particularly New Zealand and Canada. The development of export from these

(1) See the articles on "International trade in butter and cheese in 1929" and "Production of butter and cheese in the important European countries exporting these products" (Monthly Crop Report and Agricultural Statistics, 1930, Nos. 3 and 12).

countries has by no means taken place so uniformly as may be stated to be the case, practically without exception, for the principal European exporting countries. Only New Zealand has clearly shown a large increase in the quantities of butter and cheese placed on the world market. While various European countries have recently, within a short period of time, become important sources of supply for butter, Canada, one of the above mentioned countries, has, within the last five years, ceased to be an important exporter and become predominantly an importer of butter with only a small export. The fact that, generally speaking, the exports of butter and cheese from the above non-European countries have made only comparatively small progress in the last decade is explained, apart from increased home consumption, principally by the fact that their production has not grown so strongly as in the chief European exporting countries, but has partly lost ground.

I. — PRODUCTION OF BUTTER.

Of the non-European countries, New Zealand is the principal butter exporter. Australia takes the second place at a much lower level, having a rather larger production but a considerably heavier home consumption. On an average for the last four years (1926-27 to 1929-30) the proportion of butter production exported was about $\frac{7}{10}$ for New Zealand and only about $\frac{1}{3}$ for Australia. As a result of the increasing home consumption of these two countries, a comparison with the average of the preceding four year period reveals a reduction in the proportion of production exported.

I. — Butter Production.

COUNTRIES	1929-30	1928-29	1927-28	1926-27	1925-26	1924-25	1923-24	1922-23
Thousand lbs.								
New Zealand	257,814	228,064	208,704	200,902	170,170	191,255	170,894	182,822
Australia	297,000	289,883	280,037	252,531	273,314	313,952	226,606	234,995
Percentages (1929-30 = 100).								
New Zealand	100	88.7	81.0	77.9	69.5	74.2	66.3	70.9
Australia	100	97.6	94.3	85.0	92.0	105.7	76.3	79.1

The figures in the above table illustrate that the production of butter in both New Zealand and Australia fluctuated during the first four years of the period under consideration but during the second four years showed constant growth. In New Zealand the development was particularly favourable.

Despite the rather limited quantity of butter produced in Argentina, the latter must also be considered as one of the important butter exporting countries, as only a small part of the production is consumed in the country. In Argentina, the proportion of production exported on the average for the years 1926-1929 was about $\frac{7}{10}$, the same as for New Zealand; the proportion exported also shows a decline in comparison with the average of the preceding four years.

The total annual production of Canadian butter has recently been approached by that of New Zealand; since 1926 only an unimportant, constantly decreasing proportion of this total production has arrived on the foreign market. On an average for the years 1924 and 1925 however, Canada exported not much less than $\frac{1}{10}$ of its considerable butter production.

The above data reflect the rise and fall of production which has been a noteworthy feature in the last decade in both Argentina and Canada.

II. — Butter production.

COUNTRIES	1929	1928	1927	1926	1925	1924	1923	1922	1921	1920
Thousand lbs.										
Argentina	61,475	67,187	64,823	70,050	73,335	86,118	90,274	73,617	72,206	63,207
Canada	262,724	254,027	271,979	272,209	269,465	278,804	—	—	—	215,179
Percentages (1929 = 100).										
Argentina	100	103.2	104.6	123.7	119.3	140.1	146.8	119.8	117.6	102.8
Canada	100	98.2	103.5	103.6	102.6	106.2	—	—	—	81.9

Production of butter in Argentina has declined considerably since 1923 and 1924 when particularly high total quantities were reached. Canadian butter production has also on the whole fallen since 1924 but not so rapidly; in 1929, however, it was still considerably above the level recorded in the census returns of 1920.

II. — PRODUCTION OF CHEESE.

In recent years New Zealand has become by far the most important cheese exporting country outside Europe; its exports in 1929 were more than twice as large as those of Canada and in 1930 the disparity developed still more to the disadvantage of the latter country. As only a very small part of New Zealand cheese is home-consumed, the development of export is in close relation to that of production.

III. — Cheese production in New Zealand.

1929-30	1928-29	1927-28	1926-27	1925-26	1924-25	1923-24	1922-23
Thousand lbs.							
190,424	199,610	173,610	175,198	170,258	160,802	171,917	139,774
Percentages (1929-30 = 100).							
100	101.6	88.4	89.2	88.7	81.9	87.5	71.2

The above figures show the rapid rise in the curve of cheese production in New Zealand; the slight fluctuations have little effect in view of the dominant upward movement. The recent standardisation of production has been of great importance in this development.

The decrease in Canada's cheese exports (which, in any case, is far from being so large as that of the butter exports) is connected with the growth in home consumption of cheese, estimated in 1925 at 3.13 lbs and in 1928 at 3.63 lbs. per head, but primarily with the decrease in production.

IV. — Cheese production in Canada.

1929	1928	1927	1926	1925	1924	1920
Thousand lbs.						
119,196	145,020	138,472	172,248	177,672	150,158	149,735
Percentages (1929 = 100).						
100	121.7	116.2	144.6	149.1	126.0	125.7

Since 1925, which represented a maximum point in the curve of Canadian cheese production, the decrease has been interrupted only in 1928. Production in 1929 was also relatively small in comparison with the census returns for 1920. It must also be mentioned that the production of Canadian "process cheese", which is manufactured from the ordinary cheddar cheese by a special process, has similarly declined from about 32.7 million lbs. in 1925 to about 17.7 million lbs. in 1929.

Condition of livestock and derivatives.

Irish Free State : The comparatively mild weather of January allowed outlying stock to forage a fair amount of keep off the pastures, thus easing the demand on fodder reserves. Supplies are anticipated to prove adequate until the end of the season. Milk yields fell off considerably during January and were appreciably below those of the corresponding period last year.

Great Britain and Northern Ireland : In England and Wales, owing to the open weather, demands on winter keep have not been unduly heavy and it is confidently anticipated that supplies will be sufficient to carry over to the spring. Farmers' stocks of hay on 1 January 1931 were the highest recorded since 1915, there being 5,290,000 tons on hand or 67 % of the 1930 crop, as compared with 3,255,000 tons or 61 % of the 1929 crop on the corresponding date last year. This increase in stocks is due primarily to the abundant harvest but also to the reduced demand owing to the open weather. On the other hand, stocks of straw again showed a decline and, at 2,323,000 tons (60 % of the 1930 crop) were lower than on the corresponding date of any year since 1915.

In Scotland in many districts no pasture is available but in other districts grass is comparatively plentiful for the season. Hay is plentiful in a few districts but roots, especially turnips, are generally scarce; in most southwestern areas, however, fodder supplies are fairly plentiful. Ample supplies of concentrated feeding-stuffs are available though there is a shortage of cotton-cake and wheat milling offals at the port of Leith.

In Northern Ireland plentiful supplies of feeding-stuffs continue to be available but there, too, turnips are reported to be scarce in some districts. Home-grown oats and purchased feeding stuffs are, on account of their low values, being fed liberally to livestock.

Throughout the area milk yields have generally been well maintained for the season.

Brazil : In the northern areas of Brazil cattle disease is spreading, threatening especially the important area of Matto Grosso. Farmers have requested the Government to take energetic measures to combat the disease.

Canada : As a supplement to the table of numbers of livestock in Canada published in the Bulletin of last month there are given below the inspected slaughtering of livestock in Canada in 1930 compared with the corresponding figures for 1929 :—

	Cattle	Calves (Head)	Hogs	Sheep
1930	602,007	376,237	1,926,325	745,119
1929	701,866	414,781	2,353,161	725,004

United States : Present livestock conditions ; At the end of January mild weather favoured livestock in most States east of the Rocky Mountains but water shortage in parts of the Ohio valley is still serious. The great western grazing areas were also fa-

voured, but moisture is needed in the central Rocky Mountains. Wheat fields furnished considerable pasturing in the Southwest but moisture is needed in some parts of this area.

Algeria : Livestock are recovering after the December-January rains ; their condition still leaves something to be desired.

French Morocco : Condition of livestock is good but the maintenance situation is mediocre, despite the improvement in feed and water conditions.

Tunis : The condition of livestock has improved since the general rain at the beginning of January ; it is rather satisfactory in the North and most regions of the Centre, but still leaves something to be desired in the South. Lambing in the South took place under bad conditions.

Production of meat, lard, milk, wool and eggs in the U. S. S. R.

According to the data published by the Gosplan, production of meat and lard, milk, wool and eggs in the U. S. S. R. during the last three years was as follows.

	Meat and lard — (1000 centals)	Milk — (1000 centals)	Wool — (1000 centals)	Eggs — (millions)
1930	69,821	627,416	3,109	6,500
1929	106,572	650,895	3,942	10,166
1928	86,554	683,766	3,918	10,488

Although the data for 1930 are provisional they show an undoubtedly marked decline in animal production with respect to the preceding years. As compared with 1929 the decline for meat and lard has been 34.5 %, for milk 3.6 %, for wool 21.1 %, and for eggs 36.1 %.

This general decline has been due to the fall in numbers of livestock, which, according to the Gosplan, was in 1928-30 as follows :

	Cattle (total) —	Cows —	Sheep —	Pigs —
1930	53.8	26.6	100.6	13.2
1929	67.2	30.3	134.0	20.5
1928	70.7	30.8	133.6	26.1

The data for 1930, especially for sheep and pigs, differ notably from those published in the Bulletin for the preceding month, the new data placing these at a higher level. Even according to the new data, however, there is a marked diminution in the livestock population in 1930, a diminution of 19.9 % for total cattle, 12.2 % for cows, 24.9 % for sheep and 35.6 % for pigs.

It is not without interest to note that while the number of cows has declined by 12.2 %, milk production has declined by only 3.6 %.

Data for poultry are lacking but the decline in egg production is confirmed by the diminution of exports, which in the economic year (1 Oct.-30 Sept.) 1927-28 amounted to 2,081,000 centals, rising to 1,149,000 in 1928-29, and in the first 9 months (Oct-July) of 1929-30 to 477,000 against 956,000 in the corresponding period of 1928-29. On the

other hand the export of both live and dead fowls, which amounted in 1927-28 to about 359,000 centals, and in 1928-29 rose to 467,000, was in the first nine months of 1929-30 518,000 centals, though in view of the fact that in the period July-September of the preceding year it was very small, it may be assumed that there will be no great augmentation of this number taking 1929-30 as a whole.

Livestock in Germany.

In the table appended are given the data of the last annual enumeration of livestock in Germany, carried out on 1 December 1930, compared with those of the last five years and of 1913.

The details for pigs, which were published in the Bulletin for January, have not been reproduced. The total for 1930 has been slightly modified owing to recent corrections.

Numbers of Livestock in Germany in the years 1925 to 1930 and in 1913 (1).

	Dec. 1 1930	Dec. 2 1929	Dec. 1 1928	Dec. 1 1927	Dec. 1 1926	Dec. 1 1925	Dec. 1 1913 (1)	% of 1930	
	Thousand Head							1929 100	1913 100
<i>Horses (2)</i>	3,520	3,617	3,718	3,810	3,873	3,917 (3)	3,807	97.3	92.5
of which: Horses under 1 year old	127	135	129	180	185	250	—	14.1	—
Horses from 1 to 5 years old	644	740	800	990	1,082	1,097	—	87.0	—
Horses from 5 to 9 years old	1,200	1,303	1,259	1,176	1,090	1,014	—	96.7	—
<i>Asses and Mules</i>	19	21	24	—	—	30 (4)	10	90.5	190.0
<i>Cattle</i>	18,431	18,035	18,414	18,011	17,221	17,292	18,474	102.2	99.8
of which: Calves under 3 months old	1,946	1,612	1,551	1,551	1,408	1,526	1,084	108.9	97.7
Cattle from 3 months to 2 years old	5,611	5,422	5,658	5,342	4,938	5,044	5,449	103.5	103.0
Bullocks and bulls 2 years old and over	758	743	780	780	793	874	1,300	102.0	55.4
Cows and heifers 2 years old and over	10,417	10,356	10,416	10,288	10,082	9,958	9,973	100.6	104.5
Dairy cows for milk	(7,006)	(7,075)	(7,060)	(6,935)	(6,732)	(6,835)	—	99.9	—
Dairy cows for milk and draught purposes	(2,344)	(2,322)	(2,413)	(2,458)	(2,406)	(2,510)	—	100.9	—
<i>Pigs</i>	23,385	19,944	20,106	22,890	19,424	16,200	22,533	117.2	103.7
<i>Sheep</i>	3,501	3,480	3,635	3,819	4,080	4,753	4,988	100.6	70.2
of which: ewes one year old and over	2,172	2,191	2,282	2,379	2,542	2,907	—	90.1	—
<i>Goats</i>	2,578	2,625	2,890	3,225	3,484	3,796	3,164	98.2	81.5
of which: nanny goats one year old and over	2,116	2,222	2,460	2,711	2,924	3,170	—	95.2	—
<i>Poultry</i>	98,054	92,154	84,509	79,418	75,705	71,504 (4)	71,907	106.4	136.4
of which: hens in general	87,937	83,274	76,003	71,350	67,800	64,122	65,970	105.6	137.5
(layers)	(60,511)	(66,464)	(62,800)	(61,427)	—	—	—	104.6	—
Geese	6,230	5,564	5,656	5,505	5,405	5,339	5,851	112.0	106.5
Ducks	3,486	3,316	2,850	2,563	2,410	2,043	2,086	117.2	186.3
<i>Bee-hives (number)</i>	1,997	1,728	1,624	1,639	—	1,551 (4)	2,289	115.6	86.9

(1) Present territory, excluding the Sarre. — (2) Not including army horses the number of which was 40,649 in 1930, 40,487 in 1929 and 1928, and 40,465 in 1927. — (3) Including army horses. — (4) 1912.

The number of horses continues to diminish. At the end of 1930 it was almost 98,000 below that of 1929, following on a diminution of about 100,000 in the latter year. The rate of decline in 1930 has accelerated. From 1925 to 1930 there has been a decrease of almost 400,000, which can hardly fail to have a repercussion on the demand for fodder, especially for oats. The fact that the number of horses under one year on 1 December 1930 is also the lowest recorded in the last five year shows the persistence of the tendency to restrict horse-rearing.

On the other hand the total number of cattle on 1 December 1930 is the highest of the last quinquennium, almost attaining the 1913 level. The greatest proportional increase with respect to 1929 is that of calves under three months. This is partly ex-

plained by the preference of consumers for young meat and partly by the tendency of producers to maintain the number of cattle at least at the present level.

The steady decrease in the sheep population recorded during the preceding quinquennium did not continue in 1930 and the number on 1 December 1930 slightly exceeded that on 1 December 1929 though it still remains below the 1,252,000 registered in 1925. The increase is to be attributed solely to animals below one year, so that a recovery in sheep numbers is to be expected in the near future.

The number of goats continued to decrease in 1930. It is interesting to notice that the diminution with respect to last year is exclusively in goats of one year and over, bred chiefly for milk production.

One of the most interesting tendencies of present-day German agriculture is the steady increases in the numbers of poultry and of beehives during the last three years. To balance the accounts of their holdings, threatened constantly by the agricultural crisis, the cultivators are giving increasing attention to poultry rearing, encouraged by State organisations, which favour all developments tending to reduce imports of food-stuffs, amongst which eggs and live or dead poultry occupy an important place.

The number of pigs in Denmark.

The following table shows the development of pig production in Denmark, giving the respective numbers of pigs on January 15th, 1931 and on July 15th of the preceding seven years for comparison.

CLASSIFICATION	15-I 1931	15-VII 1930	15-VII 1929	15-VII 1928	15-VII 1927	15-VII 1926	15-VII 1925	15-VII 1924
Boars 4 months old and over	27,182	24,300	18,700	18,004	19,670	18,000	14,000	15,000
Sows 4 months old and over:								
in farrow	389,517	304,616	309,575	243,069	278,182	274,000	209,000	207,000
not in farrow	191,290	191,572	123,994	101,190	118,241	112,000	81,000	92,000
Pigs for fattening 4 months old and over	1,189,713	1,020,148	775,160	738,127	794,678	622,000	555,000	616,000
Young pigs 2-4 months old	1,787,337	1,619,001	1,285,322	1,256,182	1,349,909	1,015,000	878,000	1,077,000
Sucking pigs under 2 months old	1,047,024	1,070,202	1,103,061	1,011,338	1,170,050	993,000	780,000	861,000
Total (1)	5,282,063	4,910,847	3,615,878	3,362,855	3,730,730	3,034,000	2,517,000	2,868,000
(1) In 1923: 2,855,000; in 1922: 1,899,000; in 1921: 1,430,000; in 1920: 1,116,000.								

Although the data are not precisely comparable because of the different dates of the estimates, it is seen from the table that pig raising in Denmark which increased sharply and was nearly quadrupled in the last ten years, has definitely continued its upward trend.

Livestock in Italy

The following data regarding livestock in Italy have been obtained in the course of the general census of agriculture carried out in March 1930. The results are provisional and therefore susceptible to not inconsiderable variations based on the census now in progress.

Provisional Data of the Livestock Census, as on 19 March 1930.

Horses	967,406	Cattle	6,892,722
Asses	851,504	Pigs	3,157,434
Mules	440,765	Sheep	9,896,038
Hinnies	15,773	Goats	1,791,701
Buffaloes	9,236		

Livestock on farms in the United States.

In the following table are shown the number of livestock on farms on January 1, 1931 compared with those on the same date in previous years :

(Thousand head)

Year (1)	Horses and horse colts	Mules and mule colts	Cattle and calves		Sheep and lambs (3)	Swine including pigs
			Total	of which cows and heifers (2)		
1930 . . .	12,803	5,131	58,955	22,075	51,911	52,323
1929 . . .	13,364	5,279	57,978	22,443	50,503	53,238
1928 . . .	13,897	5,389	56,389	21,840	47,704	57,410
1927 . . .	14,495	5,504	55,676	21,828	44,795	60,617
1926 . . .	15,133	5,652	56,832	21,801	41,881	54,788
1925 . . .	15,830	5,740	59,122	22,188	39,790	52,148
1924 . . .	16,470	5,725	61,906	22,498	38,112	55,568
1923 . . .	17,222	5,730	64,507	22,255	36,876	66,361
1922 . . .	17,943	5,702	66,156	22,063	36,212	69,044
1921 . . .	18,564	5,638	67,264	21,788	36,186	59,559

(1) January 1 of the year after that given in the table (Jan. 1, 1931, Jan. 1, 1930, etc.).

(2) 2 years old and over kept for milk.

(3) Including estimates on sheep and lambs on feed for market as well as on farms.

The beginning of the year 1931 marks a further increase in the total number of cattle and calves ; of this increase, just over one-half was due to an increase in the number of cows and heifers two years old and over kept for milk. The number of heifers one to two years old kept for milk is maintained at the comparatively high number of 4,688,000 head against 4,675,000 on January 1, 1930 and 4,416,000 on January 1, 1929.

Meat prices fell rapidly during 1930, the average price for 100 lbs. of beef cattle received by producers fell from 8.69 dollars on January 15 (compared with 8.97 on January 15, 1929) to 6.37 on December 15 (compared with 8.48 on December 15, 1929). Corresponding prices for 100 lbs. of veal calves fell from 11.84 dollars (12.20 dollars) to 8.84 (11.69).

Total slaughtering of cattle and calves under Federal inspection during the first eleven months of 1930 was not greatly different from the low figure for the corresponding period of 1929 but returns to producers were much smaller as a result of the fall in meat prices ; the number of calves slaughtered formed a rather larger proportion of the total than has been usual in recent years, and cattle were marketed in an unfinished condition.

The number of cattle on feed for market in the 11 Corn Belt States was 10 % smaller on January 1, 1931 than on January 1, 1930, according to the cattle feeding estimate of the Department of Agriculture, due to the short corn crop and heavy losses of many feeders in 1929 as well as to difficulties of financing feeding operations. Present indications consequently point to a small market supply of fed cattle during the first few months of 1931.

As far as number of cattle is concerned, the beef trade does not appear to be in an unfavourable position although the business crisis has reduced demand and cattle prices are expected to fall during the first half of 1931 ; cattle owners have the advantage of cheap feed grain to compensate the short hay and maize production caused by the drought in 1930.

Despite the low levels of prices of dairy products, the number of dairy cows continues to increase ; production of dairy products is also gaining and with consumption down during the present business crisis, the position of the dairy industry may be described as unsettled. For these reasons the Dairy Advisory Committee has again recommended the culling of dairy herds.

The number of hogs on farms on January 1, 1931 was smaller than at the beginning of 1930, continuing the constant decrease noted since 1927 ; the present number is the

lowest since 1914 with the exception of that recorded at the beginning of 1926. On examination of the following table it is seen that annual slaughterings have averaged rather high during the last decade relative to production, and were lower only at the middle of the decade when the corn-hog ratio (the relation between corn and hog prices

Year	Number of hogs (thousand head) (1)	Slaughterings under F. I. (thousands) (3)	Average price of hogs received by producers (dollars per 100 lbs.) (2)	Average price of maize received by producers (cents per bushel) (2)	Number of bushels of corn equal in value to 100 lbs. of hogs
1930	52,323	(3) 30,619	(4) 8.95	(4) 79.2	(4) 11.3
1929	53,238	48,445	9.44	87.6	10.8
1928	57,410	49,705	8.75	80.1	9.8
1927	60,617	43,633	0.68	78.8	12.3
1926	54,788	40,630	11.80	69.9	16.9
1925	52,148	43,043	11.00	99.9	11.0
1924	55,508	52,873	7.48	91.2	8.2
1923	66,361	53,334	7.13	80.2	8.9
1922	69,044	43,114	8.40	59.6	14.1
1921	59,559	38,982	7.84	56.8	13.8

(1) On January 1 of the year after that given in the table (Jan. 1, 1931 Jan. 1, 1930, etc.). — (2) Simple average of monthly prices. — (3) First 11 months of 1930; corresponding figures for 11 months of 1929, 1928 and 1927 are respectively (in thousand): 43,362; 44,013; 38,765. — (4) First 11 months of 1930.

according to the formula "number of bushels of corn (maize) equal in value to 100 lbs. of hogs") was rather high, or in other words, when production was favoured and slaughtering discouraged by low feeding prices relative to hog prices and demand on the part of the consumer; in fact, on examination of the table, the following general tendencies may be noted: (1) an upward and favourable movement in the corn-hog ratio (as for example in 1926) corresponds to an increase in the number of hogs in the following year; (2) that an upward and favourable movement in the freeing ratio generally coincides with a reduction of slaughterings in the same period.

The number of hogs on January 1, 1931 shows a comparatively small reduction of about one million head compared with the previous year although the total pig crop for the United States in 1930 was 4 % smaller than in 1929; this is partly due to the unusual price conditions obtaining throughout the United States, practically all prices being depressed during the present crisis; thus although maize production (for grain) in 1930 in the United States was 20 % smaller than in the previous year (due to severe summer drought and farm stocks of maize on January 1, were 22 % smaller, maize prices have been low enough in relation to hog prices to encourage heavy feeding and unusually small marketing of hogs in the last months of 1930; feeding was also stimulated by plentiful alternative supplies of wheat, oats and barley at very low prices. Consequently the contrary of what might be expected has occurred, namely, that in a year of poor maize production, slaughtering has decreased while hog production for the following year, 1931, has increased. According to the government estimate made at the beginning of December on the basis of the number of sows bred or to be bred for farrowing in 1931, assuming an average number of pigs saved per litter, there was expected to be a small decrease in the spring pig crop of 1931 but in the light of the more recent events set out above, this decrease may not take place unless there is a very marked change in the maize and hog situation in the early months of 1931; although maize supplies are low due to the heavier early consumption of the 1930 maize crop, there appear to be plentiful supplies of cheap alternative grains for feeding purposes. On January 15 the corn-hog ratio had risen higher, as hog prices declined relatively less than maize (corn) prices, so that on this date the price situation was still favourable to production.

The total number of horses and also that of mules continue to decrease. In the

case of horses, draught horses show a reduction, but it has been authoritatively stated that the steady growth in popularity of horses for recreation resulted in rapid expansion of this branch of the horse industry even during the depression year of 1930 when prices for these animals were near the highest levels on record. The number of riding horses in the United States is now undoubtedly the largest in history and it is estimated that the total of horses used for recreation in the country is about 200,000 and is growing materially year by year. The quality of riding horses has improved steadily since only the best are retained now and there has been a great stimulation in recent years to the holding of horse shows, both national and international, with an increase in prizes awarded. Trade reports show that the average price of the better grades of saddle horses at Chicago last year was about 750 dollars, the medium and lower grades selling at an average of about 175 dollars. The average price received by producers for horses in general on December 15, 1930 however, was 64.49 dollars compared with 77.35 on December 15 1929 and 81.00, the average price for the year 1929.

The increase in the number of sheep and lambs noted during the last decade was continued in 1930, the number on January 1, 1931, representing a new record. The 1930 lamb crop was 8 % larger than those of 1929 and 1928 the figures being: 28,458,000; 26,441,000 and 26,363,000. Slaughter of sheep and lambs was abnormally high during the first ten months of 1930, greatly exceeding that of previous years and exceeding slaughterings for the first ten months of 1929 by nearly 19 % although prices fell more or less steadily with few interruptions during the year; the average price received by producers for 100 lbs. sheep fell from 6.91 dollars on January 15, 1930 (compared with 7.84 on January 15, 1929) to 3.96 dollars on December 15, 1930 (compared with 6.61 on December 15, 1929); lamb prices also declined considerably, corresponding figures being January 15: 11.10 dollars (12.23 dollars) and December 15, 6.18 (10.76). Slaughter also rose to a seasonal maximum at the end of the ten month period when prices had reached a very low level. It is apparent that the present excessive number of sheep is resulting in heavy slaughter regardless of price.

New Zealand lambing estimate.

The following table gives the estimate of the current season's lambing computed from estimated average percentages, with corresponding figures for the four preceding years, together with the actual number of lambs tailed, for comparison.

YEARS	Number of Breeding-ewes (thousands)	Estimated Average Percentage of Lambing	Estimated Number of Lambs (thousands)	Actual Number of Lambs tailed (thousands)
1930	17,564	83.77	14,714	...
1929	16,008	88.65	14,722	14,888
1928	15,534	86.09	13,373	13,856
1927	14,832	86.76	12,800	13,179
1926	13,948	84.57	11,795	12,070

A substantial drop will be noted in the lambing percentage of breeding-ewes, the figure being the lowest recorded for the past five years. Even so, the estimated number of lambs is very little below the total for 1929, the number of breeding ewes having increased, and the position may be regarded as fairly satisfactory when it is considered that that year's lambing season constituted a record for the Dominion and the decrease this season is comparatively negligible. The South Island shows the greatest decline both in percentage of lambing and in the number of lambs expected, while the North Island actually indicates a slight expansion in the expected flocks, which may be related to the increase in the sheep-rearing area there.

TRADE

COUNTRIES	DECEMBER				FIVE MONTHS (August 1-December 31)				TWELVE MONTHS (August 1-July 31)	
	EXPORTS		IMPORTS		EXPORTS		IMPORTS		EXPORTS	IMPORTS
	1930	1929	1930	1929	1930	1929	1930	1929	1929-30	1929-30
Wheat. — Thousand centals (1 cental = 100 lbs).										
<i>Exporting Countries:</i>										
Bulgaria . . . . .	...	...	...	...	(1)	802 (1)	31 (1)	0 (1)	710	66
Hungary	593	842	0	0	3,492	5,783	0	0	9,943	0
Lithuania	128	0	0	0	196	0	4	2	55	2
Rumania . . . . .	...	...	...	...	(1)	5,781 (1)	119 (1)	4 (1)	35	1,279
Yugoslavia	159	1,272	0	0	2,727	10,459	0	2	13,298	40
Canada	13,338	9,577	2	110	77,215	48,017	24	518	93,461	802
United States	1,827	4,292	798	688	28,191	30,875	5,900	1,753	57,274	7,885
Argentina	2,732	7,341	—	—	10,549	48,480	—	—	86,845	—
Chile . . . . .	...	...	...	...	(1)	392 (1)	7 (1)	0 (1)	0	481
India	37	11	478	317	1,801	225	1,354	1,812	2,768	3,931
Algeria	2,081	322	18	4	5,736	1,497	88	487	3,206	545
Tunis	82	192	71	7	1,219	2,240	119	60	3,382	90
Australia . . . . .	...	...	...	...	(1)	9,511 (1)	4,354 (1)	0 (1)	0	24,469
<i>Importing Countries:</i>										
Germany	128	163	721	3,042	100	1,989	8,450	13,783	2,293	31,725
Austria	2	2	463	437	84	2	1,744	2,639	68	6,455
Belgium	75	110	2,487	2,222	170	527	12,240	11,420	805	25,779
Denmark	0	0	445	236	15	62	1,649	1,510	128	2,903
Spain . . . . .	...	...	...	...	(1)	2 (1)	4 (1)	0 (1)	1,922	11
Estonia	0	0	...	57	0	0	245	240	0	540
Irish Free State	9	0	609	298	18	0	3,131	2,723	0	5,547
France	2	4	2,194	1,362	946	11	14,808	11,920	8,902	19,954
Gr. Brit. and N. Ir.	79	187	15,516	7,233	324	500	59,646	56,066	1,482	114,048
Greece . . . . .	...	...	...	...	(1)	0 (1)	4,535 (1)	3,812	0	12,339
Italy	0	2	3,761	1,484	22	4	20,741	5,238	4	27,150
Latvia	0	0	60	97	0	0	551	672	0	1,523
Norway	—	—	366	157	—	—	1,755	1,091	—	2,216
Netherlands	2	18	871	1,021	42	55	7,476	0,769	231	14,936
Poland	201	7	2	42	996	29	26	176	289	331
Portugal	—	—	20	20	—	—	104	586	—	8,732
Sweden	2	276	238	615	24	785	1,733	2,848	1,003	4,982
Switzerland	0	0	805	672	0	0	5,324	4,334	0	9,590
Czechoslovakia	0	22	1,687	324	2	58	4,484	1,064	108	3,802
Japan	—	—	1,138	1,043	—	—	3,827	4,081	—	10,922
Syria and Lebanon . . . . .	...	...	...	...	(1)	84 (1)	0 (1)	11 (1)	51	26
Egypt . . . . .	...	...	...	...	(1)	2 (1)	7 (1)	223 (1)	0	49
Union of South Africa . . . . .	...	...	...	...	(2)	0 (2)	0 (2)	340 (2)	871	0
New Zealand . . . . .	...	...	...	...	(2)	0 (2)	44 (2)	33 (2)	42	130
Totals	21,275	24,648	32,742	22,398	148,333	133,351	166,569	139,347	312,026	316,433
Rye. — Thousand centals (1 cental = 100 lbs).										
<i>Exporting Countries:</i>										
Germany	44	1,409	79	214	1,142	6,376	317	939	10,520	1,922
Bulgaria . . . . .	...	...	...	...	(1)	478 (1)	2 (1)	0 (1)	0	9
Hungary	280	315	0	0	851	1,517	0	0	2,919	0
Poland	368	836	0	9	4,004	2,855	0	11	7,293	20
Rumania . . . . .	...	...	...	...	(1)	470 (1)	271 (1)	0 (1)	0	377
Czechoslovakia	60	269	53	20	362	705	108	93	1,325	254
Yugoslavia	0	4	0	0	0	22	4	0	33	0
Canada	348	2	0	13	622	99	0	86	194	150
United States	0	11	—	—	46	1,276	—	—	1,378	—
Argentina	187	68	—	—	401	699	—	—	767	—
Algeria	7	2	0	0	24	26	0	4	36	4
<i>Importing Countries:</i>										
Austria	2	0	269	185	9	0	701	1,085	2	2,857
Belgium	0	0	324	117	11	2	1,038	437	7	983
Denmark	0	0	1,142	648	0	2	4,200	2,877	2	6,151
Estonia	0	0	9	87	0	0	46	492	0	1,563
Finland	0	0	4	705	0	0	1,193	2,302	4	3,314
France	0	0	79	13	0	2	459	139	7	181
Italy	0	0	64	15	0	0	306	49	0	324
Latvia	0	0	7	216	0	2	143	1,021	7	2,191
Lithuania	37	0	0	0	55	0	0	24	86	24
Norway	0	0	366	203	0	0	1,283	1,464	0	3,605
Netherlands	51	9	714	256	79	40	2,379	1,224	90	2,906
Sweden	0	0	24	212	0	9	373	1,008	11	2,240
Switzerland	0	0	18	22	0	0	97	90	0	154
Totals	1,463	2,985	3,152	2,886	8,554	13,965	12,647	13,436	25,073	28,843

(1) (2) See notes page 116.

COUNTRIES	DECEMBER				FIVE MONTHS (August 1-December 31)				TWELVE MONTHS (August 1-July 31)	
	EXPORTS		IMPORTS		EXPORTS		IMPORTS		EXPORTS	IMPORTS
	1930	1929	1930	1929	1930	1929	1930	1929	1929-30	1929-30
Wheat flour. — Thousand centals (1 cental = 100 lbs).										
<i>Exporting Countries:</i>										
Germany	4	128	11	101	112	688	79	302	1,228	710
Belgium	22	24	26	104	79	164	117	456	261	564
Bulgaria	...	...	...	...	15 (1)	3 (1)	0 (1)	0	7	0
Spain	...	...	...	...	(1)	31 (1)	0 (1)	0	66	0
France	527	9	62	37	2,564	29	817	143	8,796	392
Hungary	529	644	0	0	2,635	3,228	0	0	5,684	0
Italy	187	271	13	9	556	831	77	24	1,400	93
Poland	68	7	2	4	322	42	11	20	154	35
Rumania	...	...	...	...	(1)	227 (1)	90 (1)	0 (1)	317	0
Yugoslavia	13	73	...	0	62	216	2	0	320	2
Canada	1,179	1,186	2	13	6,973	5,551	24	62	13,285	148
United States	1,748	2,200	0	0	11,795	11,994	2	0	25,342	4
Argentina	176	207	...	...	787	1,164	...	...	2,381	...
Chile	...	...	...	...	(1)	64 (1)	78 (1)	0 (1)	203	18
India	143	60	0	0	461	434	2	0	1,113	2
Japan	205	152	18	26	1,457	1,118	143	95	2,304	379
Algeria	33	9	9	4	185	46	18	31	134	57
Tunis	29	13	0	0	110	66	7	2	156	4
Australia	...	...	...	...	(1)	3,382 (1)	2,959 (1)	0 (1)	9,185	0
<i>Importing Countries:</i>										
Austria	0	0	333	331	2	2	1,027	1,387	4	3,770
Denmark	2	2	137	112	13	15	758	650	31	1,440
Estonia	0	0	9	11	0	0	55	55	0	123
Irish Free State	4	7	311	340	22	26	1,609	1,534	64	3,622
Finland	...	...	51	472	...	...	1,296	1,457	...	2,487
Gr. Britain and N. Ir.	346	414	1,116	1,032	2,048	2,057	6,078	5,419	4,727	12,487
Greece	...	...	...	...	...	...	(1)	82 (1)	220	494
Norway	0	0	46	68	2	2	670	608	2	1,376
Netherlands	11	31	320	168	49	95	1,713	950	208	2,760
Portugal	...	...	30	7	...	...	75	79	...	152
Sweden	0	7	9	35	2	49	46	150	90	379
Czechoslovakia	2	2	571	968	7	7	2,846	1,408	13	3,393
Ceylon	...	...	42	37	...	...	216	198	...	430
Java and Madura	...	...	...	...	...	...	(1)	337 (1)	837	1,142
Indo-China	...	...	44	57	...	...	201	225	...	549
Syria and Lebanon	...	...	...	...	(1)	2 (1)	0 (1)	51 (1)	130	425
Egypt	...	...	...	...	(1)	0 (1)	2 (1)	1,182 (1)	1,470	4,729
Union of South Africa	...	...	...	...	(2)	4 (2)	4 (2)	106 (2)	176	483
New Zealand	...	...	...	...	(2)	0 (2)	0 (2)	55 (2)	46	181
Totals	5,228	5,446	3,152	3,334	33,994	39,369	18,762	17,736	72,468	42,765
Barley. — Thousand centals (1 cental = 100 lbs).										
<i>Exporting Countries:</i>										
Bulgaria	...	...	...	...	(1)	719 (1)	201 (1)	0 (1)	309	9
Spain	...	...	...	...	(1)	71 (1)	46 (1)	0 (1)	163	0
Hungary	99	395	0	0	390	1,803	0	0	2,363	0
Lithuania	0	11	0	0	...	...	0	0	143	0
Poland	306	681	0	0	1,856	2,670	0	2	5,794	2
Rumania	...	...	...	...	(1)	19,231 (1)	19,926 (1)	0 (1)	81,365	0
Czechoslovakia	567	745	0	0	2,603	1,973	2	2	2,518	15
Yugoslavia	0	26	20	22	11	216	101	112	282	159
Canada	353	291	0	0	1,217	1,107	0	4	1,250	9
United States	428	487	...	...	2,546	6,581	...	...	8,774	...
Argentina	527	97	...	...	1,504	1,084	...	...	2,557	...
Chile	...	...	...	...	(1)	196 (1)	130 (1)	0 (1)	897	0
India	0	0	0	0	2	2	0	2	26	11
Syria and Lebanon	...	...	...	...	(1)	212 (1)	174 (1)	2 (1)	508	20
Algeria	207	401	0	4	1,041	1,735	4	123	2,202	130
Egypt	...	...	...	...	(1)	2 (1)	44 (1)	26 (1)	122	40
Tunis	9	108	24	2	154	2,191	154	18	2,652	58
Australia	...	...	...	...	(1)	289 (1)	53 (1)	0 (1)	324	0
<i>Importing Countries:</i>										
Germany	18	4	2,676	4,727	60	20	6,874	28,082	1,099	49,785
Austria	0	4	196	168	0	4	948	816	9	1,663
Belgium	13	2	1,188	840	57	37	4,634	3,635	176	7,857
Denmark	134	326	2,079	187	582	896	7,494	549	1,232	4,455
Estonia	...	...	2	2	...	...	13	81	...	68
Irish Free State	4	2	2	0	18	24	11	4	26	333
France	4	29	861	196	11	79	2,934	992	348	1,437
Gr. Britain and N. Ir.	2	2	8,185	1,224	11	22	10,733	8,078	33	14,454
Greece	...	...	...	...	...	...	(1)	35 (1)	227	401
Italy	0	0	97	26	0	9	362	98	9	968
Latvia	0	0	40	11	0	0	121	98	0	123
Norway	0	0	185	15	0	0	434	267	0	752
Netherlands	24	77	1,332	604	123	218	7,072	3,406	487	7,697
Switzerland	0	0	245	194	0	0	1,182	990	0	1,616
Totals	2,695	3,698	13,979	8,322	22,922	41,491	43,126	43,537	65,629	91,699

(1) See notes page 116.

COUNTRIES	DECEMBER				FIVE MONTHS (August 1-December 31)				TWELVE MONTHS (August 1-July 31)	
	EXPORTS		IMPORTS		EXPORTS		IMPORTS		EXPORTS	IMPORTS
	1930	1929	1930	1929	1930	1929	1930	1929	1929-30	1929-30
Oats. — Thousand cents (1 cental = 100 lbs).										
<i>Exporting Countries:</i>										
Germany	13	1,300	55	81	208	6,512	106	302	15,245	620
Irish Free State	37	62	24	2	152	390	115	13	661	121
Hungary	2	40	7	0	9	498	7	0	728	0
Lithuania	11	4	0	0	51	15	0	0	179	0
Poland	9	104	0	4	84	624	0	44	1,803	66
Rumania . . . . .	...	...	...	(r)	996 (r)	692 (r)	0 (r)	0	1,834	0
Czechoslovakia	152	231	0	4	604	688	4	31	1,345	128
Yugoslavia	0	2	4	0	0	9	73	2	9	51
Canada	227	31	2	4	602	342	229	604	679	1,182
United States	9	46	4	4	71	1,166	22	13	1,576	49
Argentina	1,074	511	—	—	5,068	1,539	—	—	6,563	—
Chile . . . . .	...	...	...	(r)	802 (r)	161 (r)	0 (r)	0	622	0
Algeria	220	24	0	2	642	212	86	108	503	128
Tunis	33	51	9	0	344	547	9	0	800	0
<i>Importing Countries:</i>										
Austria	0	0	216	258	2	0	765	1,133	2	2,707
Belgium	0	0	207	216	0	0	1,691	1,014	4	2,773
Denmark	0	7	95	190	2	9	357	725	20	2,800
Estonia	0	0	0	0	0	0	26	18	0	106
Finland	0	0	37	62	0	0	57	196	0	476
France	2	2	185	251	7	11	926	1,089	77	1,671
Gr. Brit. and N. Irel.	4	7	1,054	591	26	22	4,645	3,486	306	9,658
Greece . . . . .	—	—	...	...	—	—	(r)	0 (r)	93	207
Italy	0	0	606	104	0	0	1,792	538	0	1,700
Latvia	0	0	0	0	0	0	13	82	163	99
Norway	0	0	0	0	0	0	0	57	2	170
Netherlands	9	13	445	346	24	60	1,477	1,713	185	3,728
Sweden	0	16	99	121	11	29	432	710	60	1,230
Switzerland	0	0	507	410	0	0	1,907	1,866	0	4,398
Australia . . . . .	...	...	...	(r)	24 (r)	9 (r)	0 (r)	0	46	4
Totals	1,862	2,316	3,556	2,606	9,632	13,535	14,739	13,829	33,475	34,132
Maize. — Thousand cents (1 cental = 100 lbs).										
<i>Exporting Countries:</i>					TWO MONTHS (November 1-December 31)				TWELVE MONTHS (Nov. 1-Oct. 31)	
									1929-30	
Bulgaria . . . . .	...	...	...	...	...	1,263	...	...	4,023	0
Hungary	68	800	42	2	119	2,855 (r)	95	2	3,351	132
Rumania . . . . .	...	...	...	(r)	2,222 (r)	2,751 (r)	0 (r)	0	28,424	2
Yugoslavia	1,168	1,398	4	0	1,845	2,751	7	4	12,013	33
United States	29	450	64	33	88	825	231	66	4,303	708
Argentina	13,226	9,625	—	—	23,499	16,466	—	—	96,197	—
Brazil . . . . .	...	...	...	...	...	...	...	...	328	—
Java and Madura	31	0	—	—	33	0	—	—	1,759	—
Indo-China	573	370	—	—	1,316	961	—	—	2,339	—
Syria and Lebanon . . . . .	...	...	...	(r)	13 (r)	79 (r)	2 (r)	0	434	35
Egypt . . . . .	...	...	...	(r)	0 (r)	0 (r)	9 (r)	4	97	38
Union of South Africa . . . . .	...	...	...	...	...	...	...	...	12,267	0
<i>Importing Countries:</i>										
Germany	0	0	575	1,496	0	0	906	3,053	0	16,506
Austria	0	0	467	441	0	4	785	714	18	4,312
Belgium	22	29	1,164	1,316	42	46	2,288	2,280	220	12,908
Denmark	0	0	681	428	0	0	1,413	836	0	6,250
Spain . . . . .	...	...	...	(r)	0 (r)	0 (r)	108 (r)	686	0	3,840
Estonia . . . . .	...	...	0	0	—	—	0	0	—	0
Irish Free State	0	0	911	662	0	0	1,437	1,219	29	9,047
Finland	—	—	11	7	—	—	29	33	—	137
France	4	0	1,660	2,207	11	2	4,348	4,063	46	17,357
Gr. Brit. and N. Ir.	205	108	4,127	3,483	388	192	8,975	6,872	2,150	36,306
Greece . . . . .	—	—	...	...	—	—	(r)	2 (r)	18	185
Italy	0	0	1,574	1,702	2	2	3,020	2,583	7	15,252
Norway	—	—	355	29	—	—	595	232	—	2,676
Netherlands	57	22	2,848	2,055	71	44	5,476	3,829	626	23,808
Poland	0	0	15	22	0	0	80	57	4	892
Portugal	—	—	302	108	—	—	624	236	—	1,442
Sweden	—	—	443	106	—	—	895	196	—	2,202
Switzerland	0	0	340	265	0	0	655	540	0	2,542
Czechoslovakia	0	0	806	584	0	0	1,446	858	2	5,443
Canada	2	0	439	734	2	0	1,127	2,297	4	7,573
Japan	—	—	115	112	—	—	196	218	—	1,496
Tunis	0	0	64	0	0	0	88	0	2	0
Totals	15,385	12,740	17,967	15,691	29,651	25,496	34,797	36,816	168,645	166,667

(1) See notes page 116.

COUNTRIES	DECEMBER				TWELVE MONTHS (January 1-December 31)				TWELVE MONTHS (January 1-Dec. 31)	
	EXPORTS		IMPORTS		EXPORTS		IMPORTS		EXPORTS	IMPORTS
	1930	1929	1930	1929	1930	1929	1930	1929	1929	1929

Exporting Countries:

Rice. — Thousand centals (1 cental = 100 lbs).										
Spain	...	...	...	...	(1)	1,105 (1)	635 (1)	0 (1)	0	—
Italy	545	672	2	20	4,716	4,308	134	556	—	—
United States	417	423	20	68	2,621	3,033	293	359	—	—
India	2,255	1,861	64	0	57,323	45,149	139	578	—	—
Indo-China	1,146	1,775	—	—	24,663	32,443	—	—	—	—
Siam	1,664	1,786	—	—	20,686	22,893	—	—	—	—
Egypt	...	...	...	...	(1)	988 (1)	1,376 (1)	247 (1)	324	—
Importing Countries:										
Germany	110	152	236	207	1,504	2,557	5,503	6,576	—	—
Austria	0	0	57	68	0	0	606	631	—	—
Belgium	0	2	97	64	9	26	1,047	873	—	—
Denmark	0	0	18	22	0	0	130	174	—	—
Estonia	—	—	2	2	—	—	35	64	—	—
Irish Free State	0	0	4	4	0	0	46	49	—	—
France	137	223	461	324	1,903	2,399	5,650	5,900	—	—
Gr. Brit. and N. Ir.	13	13	227	190	218	262	2,564	2,665	—	—
Greece	—	—	...	...	—	—	(1)	474 (1)	494	—
Hungary	2	4	57	77	9	31	388	620	—	—
Latvia	0	2	7	2	7	7	62	192	—	—
Lithuania	0	0	2	2	0	0	31	53	—	—
Norway	—	—	4	18	—	—	101	106	—	—
Netherlands	128	159	137	101	2,035	2,015	3,563	3,642	—	—
Poland	13	4	0	0	126	66	1,177	1,241	—	—
Portugal	—	—	35	60	—	—	941	908	—	—
Sweden	—	—	0	0	—	—	161	117	—	—
Switzerland	0	0	44	53	0	0	408	425	—	—
Czechoslovakia	0	0	71	101	0	0	979	1,067	—	—
Yugoslavia	0	0	93	181	2	2	516	562	—	—
Canada	0	0	46	31	0	0	584	580	—	—
Chile	—	—	...	...	—	—	(1)	472 (1)	441	—
Ceylon	0	2	1,054	787	9	13	10,809	11,325	—	—
Java and Madura	...	...	...	...	(1)	101 (1)	203 (1)	5,187 (1)	7,077	—
Japan	397	13	20	232	1,252	101	3,973	4,057	—	—
Syria and Lebanon	...	...	...	...	(1)	2 (1)	0 (1)	287 (1)	265	—
Algeria	2	4	11	13	9	18	104	95	—	—
Tunis	0	0	4	...	2	0	24	22	—	—
Union of S. Africa	...	...	...	...	(2)	0 (2)	0 (2)	809 (2)	736	—
Australia	...	...	...	...	(1)	66 (1)	71 (1)	71 (1)	143	—
New Zealand	...	...	...	...	(2)	0 (2)	0 (2)	57 (2)	55	—
Totals	6,839	7,993	2,777	2,660	119,444	118,512	47,581	52,932	—	—

Exporting Countries:

Linseed. — Thousand centals (1 cental = 100 lbs).										
Estonia	8	24	0	0	98	114	4	43	—	—
Lithuania	165	94	—	—	791	972	—	—	—	—
Argentina	4,500	4,063	—	—	48,600	63,749	—	—	—	—
India	173	402	0	0	10,291	9,846	0	4	—	—
Tunis	0	0	0	0	16	39	0	0	—	—
Importing Countries:										
Germany	0	8	409	244	47	150	9,275	12,440	—	—
Belgium	4	4	476	283	122	374	2,902	4,492	—	—
Denmark	—	—	75	0	—	—	642	575	—	—
Spain	—	—	...	...	—	—	(1)	736 (1)	709	—
Finland	0	0	12	12	0	0	142	315	—	—
France	4	8	559	445	28	28	7,657	8,433	—	—
Gr. Brit. and N. Irel.	0	0	1,213	484	16	16	8,964	11,877	—	—
Greece	...	...	...	...	(1)	4 (1)	8 (1)	110 (1)	157	—
Hungary	4	4	0	4	256	79	189	126	—	—
Italy	0	0	260	283	0	4	2,098	2,823	—	—
Latvia	165	102	71	47	421	606	209	681	—	—
Norway	—	—	91	0	—	—	638	579	—	—
Netherlands	8	12	453	520	280	264	10,081	14,198	—	—
Poland	0	67	8	0	55	575	208	619	—	—
Sweden	4	0	63	20	—	—	1,425	1,890	—	—
Czechoslovakia	—	—	47	43	81	20	796	1,114	—	—
Yugoslavia	0	0	0	0	4	0	217	282	—	—
Canada	504	180	0	51	1,898	850	811	1,874	—	—
United States	—	—	220	1,291	—	—	12,661	24,248	—	—
Japan	—	—	16	20	—	—	234	628	—	—
Australia	...	...	...	...	(1)	0 (1)	0 (1)	591 (1)	905	—
Totals	5,539	4,918	3,973	3,747	62,438	77,664	66,789	87,312	—	—

(1) (2) See notes page 116.

COUNTRIES	DECEMBER				TWELVE MONTHS (January 1-December 31)				TWELVE MONTHS (January 1-Dec. 31)	
	EXPORTS		IMPORTS		EXPORTS		IMPORTS		EXPORTS	IMPORTS
	1930	1929	1930	1929	1930	1929	1930	1929	1929	1929

Exporting Countries:

Austria	170	245	26	15	4,112	2,211	545	1,098	—	—
Denmark	28,682	27,745	51	64	372,558	350,620	1,389	1,424	—	—
Estonia	1,618	1,980	0	0	31,010	27,247	0	0	—	—
Irish Free State	734	1,757	2	397	58,815	62,836	3,391	4,542	—	—
Finland	2,800	2,632	0	0	37,726	36,610	7	2	—	—
France	858	968	2,180	1,160	12,095	16,722	12,924	9,753	—	—
Hungary	258	278	0	0	3,430	1,191	40	143	—	—
Latvia	2,211	1,993	2	4	40,630	32,624	49	49	—	—
Lithuania	725	547	—	—	16,219	9,004	—	—	—	—
Netherlands	4,844	6,744	787	344	92,394	104,325	4,396	4,469	—	—
Poland	1,005	2,145	4	2	26,714	33,248	29	112	—	—
Sweden	3,922	4,526	0	0	58,857	54,977	18	24	—	—
U. S. S. R.	—	—	—	—	(3) 15,077	(3) 49,675	—	—	—	—
Argentina	7,564	5,591	—	—	48,866	37,547	—	—	—	—
India	60	71	22	22	551	522	282	229	—	—
Syria and Lebanon	—	—	—	—	(r) 1,916	(r) 1,951	(r) 170	(r) 216	—	—
Australia	—	—	—	—	(r) 108,067	(r) 86,904	(r) 2	(r) 4	—	—
New Zealand	20,955	27,730	—	—	209,771	183,630	—	—	—	—

Importing Countries:

Germany	22	13	21,330	21,854	578	337	293,509	296,230	—	—
Belgium	223	243	3,111	1,420	2,648	2,877	22,412	9,559	—	—
Spain	—	—	—	(r) 157	(r) 163	(r) 324	(r) 348	—	—	—
Gr. Brit. and N. Irel.	4,707	1,378	73,544	60,341	21,028	14,839	764,782	716,492	—	—
Greece	—	—	—	—	—	(r) 1,259	(r) 1,387	—	—	—
Italy	95	35	518	172	1,843	1,651	3,115	1,909	—	—
Norway	7	0	53	101	236	1,191	1,530	1,351	—	—
Switzerland	2	4	2,251	1,656	42	159	18,786	16,649	—	—
Czechoslovakia	18	152	2	4	694	717	714	836	—	—
Canada	93	79	406	6,208	1,170	1,400	38,605	35,929	—	—
United States	187	249	97	128	2,967	3,913	2,471	2,773	—	—
Ceylon	—	—	75	88	—	—	723	736	—	—
Java and Madura	—	—	—	—	—	(r) 7,158	(r) 7,101	—	—	—
Japan	—	—	53	82	—	—	611	503	—	—
Algeria	9	4	192	302	82	64	3,232	2,207	—	—
Egypt	—	—	—	(r) 42	(r) 29	(r) 2,156	(r) 1,433	—	—	—
Tunis	2	2	86	79	13	18	820	717	—	—
Totals	81,771	87,131	104,792	94,518	1,170,317	1,119,211	1,185,369	1,119,225	—	—

Butter. — (Thousand lbs).

Exporting Countries:

Denmark	679	825	101	71	12,628	14,513	809	648	—	—
Finland	260	269	7	9	4,683	4,837	35	44	—	—
Italy	7,161	8,684	734	804	80,974	71,803	12,562	13,975	—	—
Lithuania	165	101	2	0	1,960	1,299	11	11	—	—
Norway	134	90	95	97	1,380	1,347	750	840	—	—
Netherlands	13,997	13,755	132	132	206,739	211,237	1,510	1,446	—	—
Poland	258	284	82	77	3,267	3,907	1,074	1,351	—	—
Switzerland	4,647	4,557	375	377	65,925	69,737	4,251	3,437	—	—
Czechoslovakia	1,036	666	106	243	8,274	7,050	2,963	3,349	—	—
Yugoslavia	324	152	18	29	4,583	4,890	300	370	—	—
Canada	4,026	4,963	121	216	66,955	92,945	1,779	2,103	—	—
Australia	—	—	—	—	5,428	(r) 4,616	(r) 148	(r) 560	—	—
New Zealand	28,327	26,169	0	0	201,863	197,552	4	7	—	—

Importing Countries:

Germany	505	370	8,878	9,341	5,410	4,910	137,459	146,570	—	—
Austria	408	146	315	318	4,482	2,923	5,637	5,717	—	—
Belgium	53	57	3,728	3,887	875	899	51,106	46,456	—	—
Spain	—	—	—	(r) 190	(r) 60	(r) 5,157	(r) 6,105	—	—	—
Irish Free State	24	15	183	170	194	154	2,350	2,410	—	—
France	3,095	3,785	7,147	5,057	38,921	40,909	65,524	52,173	—	—
Gr. Brit. and N. Irel.	653	758	38,700	25,128	8,927	9,976	348,592	335,331	—	—
Greece	—	—	—	(r) 262	(r) 355	(r) 2,213	(r) 2,996	—	—	—
Hungary	9	2	20	42	93	40	388	547	—	—
Portugal	—	—	220	146	—	—	1,010	974	—	—
Sweden	—	—	205	157	—	—	1,470	1,420	—	—
United States	183	273	5,238	7,015	2,130	3,020	68,313	79,382	—	—
India	2	0	106	115	7	7	1,133	1,237	—	—
Java and Madura	—	—	—	—	—	(r) 1,526	(r) 1,731	—	—	—
Syria and Lebanon	—	—	—	(r) 128	(r) 190	(r) 582	(r) 635	—	—	—
Algeria	15	11	1,087	844	212	194	10,397	8,468	—	—
Egypt	—	—	—	(r) 60	(r) 110	(r) 6,850	(r) 5,061	—	—	—
Tunis	2	0	165	185	29	13	1,746	1,695	—	—
Totals	65,943	65,933	67,363	54,515	726,577	749,398	737,547	724,946	—	—

(r) (s) See notes page 116.

COUNTRIES	DECEMBER				FIVE MONTHS (August 1-December 31)				TWELVE MONTHS (August 1-July 31)	
	EXPORTS		IMPORTS		EXPORTS		IMPORTS		EXPORTS	IMPORTS
	1930	1929	1930	1929	1930	1929	1930	1929	1929-30	1929-30
Cotton. — Thousand centals (1 cental = 100 lbs).										
<i>Exporting Countries:</i>										
United States . . .	4,156	4,855	22	181	21,253	22,240	95	701	5,927	1,880
Argentina . . .	9	2	—	—	207	161	—	—	538	—
Brazil . . .	—	—	—	—	(r) 163	(r) 646	—	—	1,351	—
India . . .	1,407	1,173	126	26	5,296	4,440	364	148	15,172	600
Egypt . . .	—	—	—	—	(r) 1,891	(r) 2,403	(r) 0	(r) 0	1,367	0
<i>Importing Countries:</i>										
Germany . . .	165	141	780	1,089	798	763	4,054	4,286	1,885	8,944
Austria . . .	0	0	42	62	0	2	205	249	2	562
Belgium . . .	7	13	137	216	53	55	655	847	106	2,037
Denmark . . .	—	—	11	7	—	7	60	51	—	146
Spain . . .	—	—	—	—	(r) 40	(r) 22	(r) 644	(r) 556	44	2,207
Ratona . . .	0	0	9	13	0	0	0	62	0	130
Finland . . .	0	0	22	13	0	0	84	73	2	143
France . . .	37	71	1,149	1,190	245	256	3,835	3,596	668	8,272
Gr. Brit. and N. Irel.	22	31	1,914	1,958	231	271	5,408	6,458	769	13,181
Greece . . .	—	—	—	—	(r) 0	(r) 0	(r) 66	(r) 20	—	88
Hungary . . .	—	—	20	40	—	—	126	119	—	291
Italy . . .	0	0	366	520	—	2	1,429	2,064	11	5,148
Latvia . . .	0	0	4	9	0	4	37	35	0	77
Norway . . .	—	—	7	4	—	—	22	20	—	46
Netherlands . . .	0	2	108	128	2	4	397	423	7	1,027
Poland . . .	2	2	101	108	0	13	708	582	26	1,215
Portugal . . .	—	—	60	51	—	—	163	170	—	401
Sweden . . .	—	—	49	53	—	—	212	212	—	516
Switzerland . . .	0	0	97	90	0	0	289	295	0	639
Czechoslovakia . . .	13	18	238	273	75	84	1,085	1,129	170	2,701
Yugoslavia . . .	0	0	20	15	0	0	82	71	0	198
Canada . . .	—	—	126	132	—	—	507	529	—	1,043
Japan . . .	42	20	1,105	1,019	245	82	4,173	4,460	417	13,073
Algeria . . .	0	2	0	0	2	4	0	2	33	4
Totals . . .	5,860	6,330	6,522	7,167	30,490	31,450	24,840	27,166	63,497	64,558

Wool. — (Thousand lbs).

COUNTRIES	DECEMBER				FIVE MONTHS (August 1-December 31)				TWELVE MONTHS (August 1-July 31)	
	EXPORTS		IMPORTS		EXPORTS		IMPORTS		EXPORTS	IMPORTS
	1930	1929	1930	1929	1930	1929	1930	1929	1929-30	1929-30
Wool. — (Thousand lbs).										
<i>Exporting Countries:</i>										
Spain . . .	—	—	—	—	(r) 2,163	(r) 3,120	(r) 915	(r) 498	8,062	5,781
Irish Free State . . .	558	1,464	44	101	2,198	5,157	212	417	10,249	904
Hungary . . .	108	417	227	214	1,133	2,471	562	485	10,013	1,561
Argentina . . .	(a) 36,539	26,045	—	—	65,568	46,008	—	—	301,402	—
Chile . . .	(b) 1,806	1,806	—	—	7,075	—	—	—	—	—
India . . .	—	—	—	—	(r) 20,038	(r) 207	—	—	20,318	—
Syria and Lebanon . . .	2,866	5,889	55	295	10,805	21,713	439	754	47,825	4,189
Algeria . . .	—	—	—	—	(r) 2,800	(r) 4,971	(r) 1,559	(r) 414	7,485	1,810
Egypt . . .	586	944	42	97	8,640	4,945	304	364	14,897	1,996
Tunis . . .	—	—	—	—	(r) 717	(r) 944	(r) 0	(r) 0	2,633	2
Un. of S. Africa . . .	(a) 2	71	57	44	64	207	384	337	549	1,118
Australia . . .	(b) —	—	—	—	(c) 23,163	(c) 21,539	—	—	288,677	—
New Zealand . . .	(a) 12,817	15,668	0	0	(c) 622	(c) 1,026	(c) 77	(c) 134	7,401	293
—	(b) 734	1,265	0	0	(r) 251,647	(r) 212,742	(r) 196	(r) 75	728,152	2,837
—	(c) —	—	—	—	(r) 11,865	(r) 12,275	(r) 37	(r) 42	47,375	664
—	(d) 12,817	15,668	0	0	20,042	20,393	0	2	156,771	13
—	(e) 734	1,265	0	0	7,807	8,261	0	7	43,473	7
<i>Importing Countries:</i>										
Germany . . .	(a) 701	1,318	25,122	21,140	2,978	5,743	73,610	50,593	11,188	294,117
Austria . . .	(b) 802	1,263	2,425	2,619	4,023	6,107	9,834	10,274	14,996	28,609
Belgium . . .	(a) 99	35	1,768	503	148	141	4,228	3,503	364	15,055
Denmark . . .	(b) 836	1,019	13,320	14,870	4,405	3,840	31,830	41,242	9,006	166,963
Finland . . .	(a) 1,805	2,388	439	390	7,282	9,795	1,396	1,248	25,946	4,945
France . . .	(b) 4	7	340	234	13	49	1,268	1,887	130	3,413
Gr. Britain and N. Ir.	(a) 2	42	179	115	20	44	796	650	86	1,929
Greece . . .	(b) 5,498	5,007	31,561	37,049	16,885	22,205	106,519	97,052	55,920	548,463
Italy . . .	(a) 20,507	33,085	75,162	77,852	79,633	92,482	170,206	166,099	333,774	779,872
Japan . . .	(b) —	—	—	—	(r) 132	(r) 90	(r) 719	(r) 591	659	2,714
—	(c) 53	225	14,498	5,227	661	747	26,705	14,339	2,024	95,006
—	(d) 37	185	653	1,127	833	1,098	3,605	4,495	2,085	13,109
—	(e) 40	75	152	119	291	432	540	668	968	1,885
—	(f) 130	328	741	694	597	853	1,964	1,962	2,112	10,532
—	(g) 15	46	637	846	97	209	1,892	1,989	527	6,527
—	(h) 165	560	1,896	2,965	575	1,314	8,124	9,352	3,338	34,743
—	(i) —	—	1,105	924	—	7	4,065	4,497	—	15,745
—	(j) 0	0	2,390	2,224	—	13	5,613	5,000	—	19,178
—	(k) 93	150	2,307	2,191	494	1,022	9,576	7,876	2,278	36,149
—	(l) 0	0	291	207	22	40	1,971	1,088	84	6,878
—	(m) 42	593	794	816	800	2,608	2,606	3,014	6,191	9,778
—	(n) 97	280	10,920	20,245	536	650	87,276	77,378	2,114	303,631
—	(o) 0	0	12,373	8,587	2	15	30,289	16,632	24	100,909
Totals . . .	64,739	104,163	199,896	201,369	554,516	532,158	539,319	534,973	2,179,667	2,461,916

(a) = Wool, greasy; (b) = Wool, scoured.

COUNTRIES	DECEMBER		SIX MONTHS (July 1-Dec. 31)		TWELVE MONTHS (July 1-June 30)	COUNTRIES	DECEMBER		SIX MONTHS (July 1-Dec. 31)		TWELVE MONTHS (July 1-June 30)
	1930	1929	1930	1929	1929-30		1930	1929	1930	1929	1929-30
Coffee. (Thousand lbs.).						Tea. (Thousand lbs.).					
EXPORTS.						EXPORTS.					
<i>Exporting Countries:</i>						<i>Exporting Countries</i>					
Brazil . . . . .	...	...	(1) 843,818	(1) 863,730	1,095,631	Ceylon	18,607	20,274	110,741	118,406	251,286
India	639	170	5,238	1,980	31,698	India	38,621	35,612	266,970	235,065	306,752
Java and Madura .	3,217	2,890	23,836	39,816	55,704	Java and Madura .	15,441	16,473	72,217	72,665	154,582
						Japan	1,755	1,647	15,185	19,012	24,835
<i>Importing Countries:</i>						<i>Importing Countries:</i>					
Germany	208	33	448	201	470	Belgium	4	4	20	18	26
Belgium	220	60	871	602	1,041	Irish Free State .	15	15	88	90	106
France	0	2	55	15	22	France	2	2	20	40	57
Netherlands . . .	1,014	1,502	9,643	10,016	21,268	Gr. Brit. and N. Ir.	5,858	8,942	44,348	51,716	95,771
Portugal	40	55	317	285	571	Netherlands . . .	18	2	57	18	53
Switzerland . . .	35	33	148	82	227	United States . .	42	37	276	298	542
Canada	7	11	35	49	79	Syria and Lebanon	...	...	(1) 9	(1) 22	39
United States . .	2,114	1,257	12,813	6,905	16,149	Algeria . . . . .	...	...	(1) 11	(1) 13	18
Ceylon	0	2	223	375	719	Union of S. Africa	...	...	(2) 31	(2) 24	79
Syria and Lebanon	...	...	(1) 15	(1) 42	82	Australia . . . .	...	...	(4) 481	(1) 668	1,702
Australia . . . .	...	...	(1) 26	(1) 33	62	New Zealand . . .	...	...	(2) 42	(2) 33	84
Totals	—	—	—	—	2,123,723	Totals	86,367	83,210	510,446	549,492	899,012
IMPORTS.						IMPORTS.					
<i>Importing Countries:</i>						<i>Importing Countries</i>					
Germany	10,546	18,572	164,490	138,501	313,807	Germany	734	754	6,338	5,825	12,807
Austria	1,715	2,511	10,338	10,560	20,064	Austria	137	201	688	765	1,223
Belgium	10,073	7,789	52,666	42,490	94,662	Belgium	49	35	309	287	617
Denmark	4,751	3,783	28,848	27,046	58,513	Denmark	73	73	569	547	1,195
Spain . . . . .	...	...	23,062	18,027	52,060	Spain . . . . .	...	...	(1) 134	(1) 104	355
Estonia	33	24	183	185	293	Estonia	11	11	77	71	148
Irish Free State .	22	15	181	170	463	Irish Free State .	2,304	2,216	13,084	12,432	23,310
Finland	6,680	2,359	28,497	18,384	38,614	Finland	18	22	132	128	278
France	30,382	32,580	196,067	187,656	385,618	France	324	247	1,631	1,662	3,305
Gr. Britain and N.						Gr. Britain and N.					
Ireland	2,635	2,313	18,071	17,805	36,009	Ireland	67,920	63,119	332,377	344,290	553,366
Greece . . . . .	...	...	(1) 5,318	(1) 4,991	12,452	Greece . . . . .	...	...	(1) 359	(1) 333	584
Hungary	584	630	3,657	4,142	8,128	Hungary	53	99	408	538	714
Italy	7,882	8,602	48,145	50,885	102,592	Italy	46	46	163	174	337
Latvia	31	44	194	187	331	Latvia	15	15	90	121	203
Lithuania	53	22	265	218	428	Lithuania	13	20	90	95	174
Norway	2,571	1,823	17,800	14,465	34,335	Norway	31	33	192	198	375
Netherlands . . .	9,094	6,369	51,875	50,142	98,986	Netherlands . . .	2,352	2,390	14,791	14,566	29,366
Poland	1,495	1,627	8,893	9,182	17,669	Poland	445	375	2,328	2,227	4,434
Portugal	1,248	937	5,622	4,453	9,978	Portugal	73	62	320	346	686
Sweden	7,524	6,539	49,593	50,272	99,162	Sweden	71	55	434	428	877
Switzerland . . .	2,438	2,701	13,757	14,372	31,017	Switzerland . . .	115	115	836	778	1,567
Czechoslovakia .	1,836	2,780	12,954	14,282	31,458	Czechoslovakia .	130	194	866	897	1,306
Yugoslavia	1,938	1,883	10,346	11,905	21,713	Yugoslavia	60	73	450	678	776
Canada	2,756	2,152	14,824	18,096	29,013	Canada	3,327	2,995	24,278	20,163	46,787
United States . .	144,913	126,061	755,901	718,943	1,502,080	United States . .	8,029	8,680	49,870	50,812	86,389
Chile . . . . .	...	...	(1) 4,319	(1) 4,947	12,507	Chile . . . . .	...	...	(1) 2,355	(1) 2,407	4,901
Ceylon	119	249	1,659	1,909	3,150	Syria and Lebanon	...	...	(1) 152	(1) 157	315
Japan	384	304	2,064	1,907	4,004	Algeria	470	229	1,545	1,422	2,524
Syria and Lebanon	...	...	(1) 1,107	(1) 1,067	2,504	Egypt . . . . .	...	...	(1) 4,686	(1) 6,929	14,978
Algeria	2,723	2,780	14,890	18,989	26,858	Tunis	289	238	1,554	1,545	3,148
Egypt . . . . .	...	...	(1) 4,838	(1) 10,207	27,681	Union of S. Africa	...	...	(2) 4,321	(2) 3,280	11,091
Tunis	254	388	1,080	1,984	3,470	Australia . . . .	...	...	(1) 21,674	(1) 23,477	50,784
Un. of S. Africa .	...	...	(2) 9,908	(2) 10,578	30,353	New Zealand . . .	...	...	(2) 6,440	(2) 5,494	12,461
Australia . . . .	...	...	(1) 1,280	(1) 1,889	4,253						
New Zealand . . .	...	...	(2) 181	(2) 192	450						
<i>Exporting Countries:</i>						<i>Exporting Countries:</i>					
India	150	474	2,238	4,142	6,658	India	584	853	3,428	4,783	9,828
Totals	263,810	336,348	1,568,541	1,475,736	3,132,663	Java and Madura .	...	...	(1) 5,898	(1) 7,242	14,917
						Totals	87,673	83,650	502,264	515,141	896,167

(1) (a) See notes page 116.

COUNTRIES	DECEMBER		THREE MONTHS (Oct. 1-Dec. 31)		TWELVE MONTHS (Oct. 1-Sept. 30)	COUNTRIES	DECEMBER		FIVE MONTHS (August 1-Dec. 31)		TWELVE MONTHS (August 1-July 31)
	1930	1929	1930	1929	1929-30		1930	1929	1930	1929	1929-1930
Cacao. (Thousand lbs.)						Total Wheat and Flour (*) (Thousand centals).					
EXPORTS.						a) NET EXPORTS					
<i>Exporting Countries:</i>						<i>Exporting Countries:</i>					
Grenada	...	...	(1) 666	(1) 1,206	9,052	Bulgaria	...	...	(1) 880	(4)	(4)
Dominican Republ.	4,028	2,795	7,734	4,764	42,644	Spain	...	...	(1) 22	(4)	(4)
Brazil	...	...	(1) 25,843	(1) 40,625	162,486	Hungary	1,299	1,700	7,004	10,066	17,494
Ecuador	3,448	3,580	7,000	7,092	39,399	Lithuania	128	0	203	0	62
Trinidad	4,478	5,545	8,900	10,172	54,402	Poland	287	(4)	1,385	(1)	117
Venezuela	...	...	(2) 1,548	(2) 1,792	38,773	Rumania	...	...	(1) 6,078	(1)	205
Ceylon	1,089	1,087	2,584	2,370	8,446	Yugoslavia	176	1,369	2,806	10,745	13,719
Java and Madura	209	86	888	556	2,833	Canada	14,006	11,030	36,457	52,819	110,381
Cameroon	...	...	...	...	22,780	United States	3,159	6,539	38,015	44,115	83,223
Ivory Coast	...	...	...	...	44,565	Argentina	2,967	7,617	11,599	50,032	90,019
Gold Coast	30,600	66,220	89,473	178,604	507,506	Chile	...	...	(1) 478	(1)	95
Nigeria	18,133	16,059	36,154	36,396	116,449	British India	(4)	(4)	1,058	(1)	309
St. Thomas and	...	...	...	...	...	Syria and Lebanon	...	...	(1) 9	(4)	(1)
Principe	6,590	9,573	11,658	17,622	33,012	Algeria	2,097	324	5,871	1,030	2,765
Togoland	...	...	...	...	14,367	Tunis	49	203	1,230	2,206	3,468
<i>Importing Countries:</i>						<i>Importing Countries:</i>					
Germany	432	101	432	170	216	Totals	25,068	28,782	175,123	179,691	368,636
Belgium	2	7	15	79	304						
France	0	0	73	0	37						
Netherlands	1,202	1,074	3,320	4,116	10,970						
Poland	0	0	0	11	18						
Czechoslovakia	0	7	13	20	20						
United States	884	869	2,275	2,308	7,083						
Australia	...	...	(1) 9	(1) 82	276						
Totals	71,935	107,063	198,394	396,975	1,117,243						
IMPORTS.						b) NET IMPORTS.					
<i>Importing Countries:</i>						<i>Importing Countries:</i>					
Germany	10,847	1,753	39,721	36,866	165,548	Germany	802	3,743	8,217	11,281	28,744
Austria	1,362	1,252	3,188	3,294	10,030	Austria	904	875	3,027	4,482	11,407
Belgium	1,922	1,418	4,919	4,808	17,542	Belgium	2,418	2,218	12,121	11,297	25,391
Denmark	342	492	1,235	983	6,190	Bulgaria	...	...	(5)	(1)	670
Spain	...	...	(1) 1,508	(1) 2,467	18,047	Denmark	624	384	2,628	2,295	4,654
Estonia	18	44	128	119	866	Spain	...	...	(5)	(1)	2,876
Irish Free State	46	13	112	150	858	Latvia	...	...	(1) 1,870	1,870	2,083
Finland	18	4	51	71	304	Estonia	13	79	817	313	705
France	6,920	6,215	23,949	19,370	77,947	Irish Free State	1,096	741	5,229	4,733	10,291
Gr. Brit. and N. Ir.	9,178	8,882	35,318	31,440	129,805	Finland	86	628	1,746	1,947	3,320
Greece	...	...	(1) 540	(1) 474	2,187	France	1,572	1,390	10,867	12,070	6,512
Hungary	412	492	1,113	840	4,760	Gr. Brit. and N. Ir.	16,462	7,808	64,965	60,067	122,913
Italy	1,616	1,323	4,990	4,008	14,950	Greece	...	...	(1) 4,643	(1)	4,105
Latvia	150	104	425	576	2,035	Italy	3,530	1,181	1,431	4,158	25,402
Lithuania	35	93	150	122	4,998	Norway	49	79	487	665	1,490
Norway	205	280	827	1,292	5,533	Netherlands	428	247	2,646	1,900	4,048
Netherlands	14,004	11,416	32,302	25,902	117,981	Netherlands	1,281	1,168	9,654	7,844	18,115
Poland	1,078	1,078	3,466	3,165	11,903	Poland	(5)	33	(5)	119	(5)
Sweden	670	814	1,894	2,518	8,545	Portugal	46	29	203	692	3,935
Switzerland	1,283	2,240	2,502	2,859	16,228	Sweden	247	377	1,798	2,198	4,365
Czechoslovakia	1,442	1,462	3,796	3,814	16,601	Switzerland	805	672	5,324	4,394	9,590
Yugoslavia	139	181	373	588	1,724	Czechoslovakia	2,846	787	7,602	3,594	7,921
Canada	1,085	890	3,874	4,248	17,622	Ceylon	55	51	289	285	576
United States	30,691	51,128	61,487	119,262	491,014	India	249	227	(5)	509	(5)
Australia	...	...	(1) 1,074	(1) 1,146	9,276	Indochina	60	77	267	300	732
New Zealand	...	...	(2) 161	(2) 143	1,876	Japan	888	875	2,075	2,716	8,356
Totals	83,533	101,643	229,169	279,333	1,063,913	Java and Madura	...	...	(1) 450	(1)	1,623
						Syria and Lebanon	...	...	(5) 1	(1)	225
						Egypt	...	...	(1) 1,797	(1)	1,851
						Union of South Afr.	...	...	(2) 474	(2)	1,100
						New Zealand	...	...	(2) 106	(2)	80
						Totals	32,763	23,697	148,963	148,296	325,413

(*) Flour reduced to grain on the basis of the coefficient: 1,000 centals of flour = 1,333.33 centals of grain.

a) Excess of exports over imports. — b) Excess of imports over exports.

(1) Data up to 30th November. — (2) Data up to 31st October. — (3) Data up to 30th September. — (4) See Net Imports. — (5) See Net Exports.

STOCKS

STOCKS AND AVAILABLE SALEABLE SUPPLIES OF CEREALS AND POTATOES IN FARMERS' HANDS
IN GERMANY, ON JANUARY, 15.

PRODUCTS	% Stocks: total production				% Available saleable quantities: total production			
	15-I-31	15-XII-30	15-I-30	15-I-29	15-I-31	15-XII-30	15-I-30	15-I-29
Winter wheat	33.5	43.7	39.5	45.0	28.2	35.2	31.9	35.1
Spring wheat	61.1	68.5	65.7	66.1	47.1	53.5	51.8	55.3
Winter rye	44.2	53.4	48.1	46.2	22.9	28.5	26.9	28.2
Winter barley	21.6	23.8	34.1	25.0	2.4	3.7	7.5	2.6
Spring barley	36.6	48.1	48.7	41.5	17.7	27.0	30.3	24.0
Oats	64.0	72.9	64.1	62.9	17.0	19.7	24.0	19.8
Potatoes	49.1	58.5	50.6	54.4	14.5	18.0	14.5	19.0

Authority: Preisberichtsstelle beim Deutschen Landwirtschaftsrat.

STOCKS IN ENGLAND AND WALES IN FARMERS' HANDS, ON JANUARY, 1ST.

PRODUCTS	% stocks: total production			Estimated stocks in absolute figures					
	1-I-31	1-I-30	1-I-29	1-I-31	1-I-30	1-I-29	1-I-31	1-I-30	1-I-29
				1,000 centals			1,000 bushels (1)		
Wheat	50	44	45	11,894	12,611	12,723	19,824	21,019	21,205
Barley	40	42	37	6,563	9,363	8,557	13,673	19,507	17,827
Oats	56	54	53	16,845	18,368	17,270	52,840	57,400	53,970
Potatoes	49	58	52	30,150	46,965	41,216	50,251	58,325	68,693
Hay	67	61	65	118,496	72,912	93,005	5,925	3,846	4,660
Straw	60	58	63	52,035	58,939	60,883	2,602	2,667	3,044

(1) For hay and straw thousand short tons.

STOCKS OF POTATOES IN THE NETHERLANDS IN FARMERS' HANDS, ON JANUARY, 15.

DISTRICTS WHERE GROWN	% Stocks: production			Production in absolute figures (1)					
	15-I-31	15-I-30	15-I-29	1930	1929	1928	1930	1929	1928
				1,000 centals			1,000 bushels		
Marsh soils	27	42	43	16,523	22,076	18,791	27,704	36,798	31,318
Sand and fen soils	16	15	16	29,167	37,758	34,772	45,611	62,931	57,964

(1) Production of potatoes in the communities where estimates were made.

VISIBLE SUPPLY OF CEREALS IN CANADA AND THE UNITED STATES (1).

PRODUCTS AND COUNTRIES	31-I-31	27-XII-30	29-XI-30	1-II-30	2-II-29	31-I-31	27-XII-30	29-XI-30	1-II-30	2-II-29
	1000 centals					1000 bushels				
WHEAT :										
Canada	116,815	124,016	118,799	126,880	118,245	198,858	206,698	197,998	210,643	188,742
United States . . .	121,522	119,242	124,487	104,090	80,245	202,537	198,786	207,479	178,488	133,759
TOTAL	237,337	243,258	243,286	230,476	198,500	396,395	405,429	405,477	384,126	322,501
RYE :										
United States . . .	8,481	9,010	9,505	8,224	3,757	15,055	16,089	16,073	14,686	6,709
OATS :										
Canada	4,455	4,756	4,408	6,613	6,109	13,921	14,864	13,776	20,666	19,091
United States (2) . .	8,528	9,796	9,805	8,166	5,188	26,650	30,611	30,641	25,520	16,212
TOTAL	12,983	14,552	14,213	14,779	11,297	40,571	45,475	44,417	46,186	35,303
BARLEY :										
Canada	14,422	14,735	12,603	13,762	8,825	30,045	30,697	26,256	28,671	18,386
United States (2) . .	5,151	5,698	5,690	2,949	4,287	10,731	11,662	11,854	4,894	8,932
TOTAL	19,573	20,333	18,293	16,111	13,112	40,776	42,359	38,110	33,565	27,318
MAIZE :										
United States (2) . .	9,835	7,487	4,150	9,120	15,687	17,562	13,389	7,411	16,286	28,012

Authority : *Bradstreet's* (for rye : *Grain, Seed and Oil Reporter*).

(1) Grain stored at principal interior and seaboard points of accumulation and grain in transit by canals and lakes. - (2) East of Rocky Mountains.

GRAIN AND FLOUR STOCKS AT THE PORTS OF GREAT BRITAIN AND IRELAND (1).

PRODUCTS	1-II-31	1-I-31	1-XII-30	1-II-30	1-II-29	1-II-31	1-I-31	1-XII-30	1-II-30	1-II-29
	1000 centals					1000 bushels				
WHEAT :										
Grain	9,504	12,792	7,464	8,266	3,364	15,840	21,320	12,440	13,776	5,440
Flour as grain . . .	912	960	888	800	672	1,520	1,600	1,480	1,344	1,120
TOTAL	10,416	13,752	8,352	9,072	3,936	17,360	22,920	13,920	15,120	6,560
Maize	2,856	2,064	2,280	3,120	3,452	5,100	3,686	4,071	5,571	6,129
Barley	1,840	1,880	1,460	1,560	1,400	3,883	3,917	3,042	3,250	2,917
Oats	1,312	1,008	1,376	672	496	4,100	3,150	4,800	2,100	1,550

Authority : *Broomhall's Corn Trade News*.

(1) Imported cereals.

STOCKS OF COTTON ON HAND IN THE UNITED STATES.

LOCATION	31-I-31	31-XII-30	30-XI-30	31-I-30	31-I-29	31-I-31	31-XII-30	30-XI-30	31-I-30	31-I-29
	1000 centals					1000 bales (counting round as half bales)				
In consuming establishments	7,723	8,083	7,629	8,857	8,558	1,614	1,660	1,567	1,890	6,766
In public storage and at compresses . . .	37,988	40,884	40,930	26,182	22,348	7,999	8,877	8,397	5,407	4,615
TOTAL	45,711	48,917	48,559	35,039	30,906	9,558	10,037	9,964	7,297	6,283

STOCKS OF COTTON AT BOMBAY AND AT ALEXANDRIA.

Ports	29-I-31	31-XII-30	27-XI-30	30-I-30	31-I-29	29-I-31	31-XII-30	27-XI-30	30-I-30	31-I-29
	1000 centals					1000 bales (1 bale = 478 lbs.)				
Bombay (1)	3,244	2,548	1,597	4,589	3,063	679	533	334	960	829
Alexandria	5,208	5,214	4,820	3,371	3,425	2,108	1,091	1,010	705	717

Authorities: *East Indian Cotton Ass.* and *Alexandria General Produce Ass.*

(1) Stocks held by exporters, dealers and mills.

STOCKS OF COTTON IN EUROPE.

COUNTRIES, PORTS, DESCRIPTIONS	29-I-31	31-XII-30	27-XI-30	30-I-30	31-I-29	29-I-31	31-XII-30	27-XI-30	30-I-30	31-I-29
	1000 centals					1000 bales (1 bale = 478 lbs.)				
<i>Great Britain</i> (1):										
American	2,870	2,651	1,025	2,361	3,707	602	555	408	494	776
Argentine, Brazilian, etc.	188	210	221	605	173	39	44	46	127	36
Peruvian, etc. . . .	307	426	429	360	207	83	89	90	77	56
East Indian, etc.	322	288	166	206	173	68	60	35	43	36
Egyptian, Sudan- esc	1,448	1,432	1,297	901	698	303	299	271	207	146
Other (2)	228	233	233	251	205	48	49	49	53	43
TOTAL	5,402	5,240	4,271	4,784	5,223	1,143	1,066	894	1,001	1,093
<i>Bremen</i> :										
American	2,712	2,070	2,223	2,554	3,253	568	560	465	535	680
Other	73	72	42	39	18	15	15	9	8	4
TOTAL	2,785	2,751	2,265	2,593	3,271	583	575	474	543	684
<i>Le Havre</i> :										
American	1,627	1,478	1,074	1,312	1,180	340	309	225	274	247
Other	169	168	126	117	78	36	35	26	25	16
TOTAL	1,796	1,646	1,200	1,429	1,258	376	344	251	299	263
<i>Total Continent</i> (3):										
American	4,036	4,838	3,532	4,484	5,001	1,033	1,012	739	938	1,046
Argentine, Brazilian, etc.	148	164	136	77	33	31	32	29	16	7
E. Indian, Australian, etc.	210	213	182	117	163	44	45	38	24	34
Egyptian	145	121	96	115	86	30	25	20	24	18
W. Indian, W. African, etc.	82	80	82	94	51	17	17	17	20	11
TOTAL	5,521	5,406	4,028	4,887	5,334	1,155	1,131	843	1,022	1,116

Authority: *Liverpool Cotton Ass.*

(1) Data for following day. — (2) Includes: W. Indian, etc.; E. African, etc.; W. African, and Australian. — (3) Includes Bremen, Havre, and other Continental ports.

THE FALL IN PRICES OF AGRICULTURAL PRODUCTS IN 1930.

The very marked fall in prices of agricultural products during the year 1930 and the extremely low level which they have reached in recent months, are characteristic features of the world economic crisis.

TABLE I. — *Wheat prices, in American cents per bushel (60 lbs.).*

PERIODS	Winnipeg No 1 Manitoba	Chicago No 2 Hard Winter	Buenos Aires Barletta	Karachi Karachi White	Liv. and London No 3 Manitoba	Liv. and London No 2 Hard Winter	Liv. and London Rosafé	Liv. and London Karachi White	Liv. and London Australian	Berlin Home grown	Antwerp Home grown	Paris Home grown	Milan Home grown
Commercial year (1):													
1927-28	140 ¹ / ₂	137 ¹ / ₂	137 ¹ / ₂	133 ¹ / ₂	154 ¹ / ₂	151 ¹ / ₂	150 ¹ / ₂	159 ¹ / ₂	159 ¹ / ₂	162 ¹ / ₂	137 ¹ / ₂	172 ¹ / ₂	189
1928-29	124	119 ¹ / ₂	113 ¹ / ₂	140 ¹ / ₂	138 ¹ / ₂	131 ¹ / ₂	128 ¹ / ₂	n. q.	139 ¹ / ₂	141 ¹ / ₂	122 ¹ / ₂	165 ¹ / ₂	188 ¹ / ₂
1929-30	124 ¹ / ₂	114 ¹ / ₂	114 ¹ / ₂	121 ¹ / ₂	137 ¹ / ₂	126	122 ¹ / ₂	128 ¹ / ₂	132 ¹ / ₂	164 ¹ / ₂	117 ¹ / ₂	148 ¹ / ₂	188 ¹ / ₂
Monthly average:													
July, 1929	158 ¹ / ₂	133 ¹ / ₂	121 ¹ / ₂	135 ¹ / ₂	168	148 ¹ / ₂	141 ¹ / ₂	161 ¹ / ₂	149	161 ¹ / ₂	127 ¹ / ₂	160 ¹ / ₂	178 ¹ / ₂
October, "	141	125	120 ¹ / ₂	135 ¹ / ₂	151 ¹ / ₂	131 ¹ / ₂	125 ¹ / ₂	130 ¹ / ₂	134 ¹ / ₂	149 ¹ / ₂	121 ¹ / ₂	155	185 ¹ / ₂
January, 1930	129 ¹ / ₂	122 ¹ / ₂	123 ¹ / ₂	133 ¹ / ₂	146 ¹ / ₂	137 ¹ / ₂	133 ¹ / ₂	n. q.	142 ¹ / ₂	150 ¹ / ₂	115 ¹ / ₂	146 ¹ / ₂	194 ¹ / ₂
April, "	110 ¹ / ₂	108	113 ¹ / ₂	110 ¹ / ₂	125	120 ¹ / ₂	116 ¹ / ₂	124 ¹ / ₂	123 ¹ / ₂	174 ¹ / ₂	111 ¹ / ₂	141 ¹ / ₂	194 ¹ / ₂
July, "	96	89	98	89 ¹ / ₂	108 ¹ / ₂	102 ¹ / ₂	102 ¹ / ₂	104 ¹ / ₂	110 ¹ / ₂	186 ¹ / ₂	115 ¹ / ₂	166 ¹ / ₂	178
August, "	92 ¹ / ₂	88 ¹ / ₂	97 ¹ / ₂	91 ¹ / ₂	106 ¹ / ₂	103 ¹ / ₂	106 ¹ / ₂	107 ¹ / ₂	111 ¹ / ₂	183 ¹ / ₂	120 ¹ / ₂	179 ¹ / ₂	181 ¹ / ₂
September, "	78	83 ¹ / ₂	88	79 ¹ / ₂	93	93 ¹ / ₂	94	94 ¹ / ₂	96	155	77 ¹ / ₂	183	178 ¹ / ₂
October, "	73	79	77 ¹ / ₂	71 ¹ / ₂	86 ¹ / ₂	86 ¹ / ₂	81 ¹ / ₂	87	88 ¹ / ₂	147 ¹ / ₂	66 ¹ / ₂	180	170 ¹ / ₂
November, "	64 ¹ / ₂	74 ¹ / ₂	65 ¹ / ₂	66 ¹ / ₂	78 ¹ / ₂	n. q.	74	82 ¹ / ₂	84 ¹ / ₂	161 ¹ / ₂	62	175 ¹ / ₂	157
December, "	55 ¹ / ₂	n. 78 ¹ / ₂	58 ¹ / ₂	57 ¹ / ₂	73 ¹ / ₂	n. q.	67 ¹ / ₂	76 ¹ / ₂	80 ¹ / ₂	160 ¹ / ₂	61 ¹ / ₂	178 ¹ / ₂	147 ¹ / ₂

(1) Commercial year: August-July.

TABLE II. — *Rye, barley and oats prices, in American cents per bushel.*

PERIODS	RYE (56 lbs.) (1)				BARLEY (48 lbs.) (1)				OATS (32 lbs.) (1)				
	Warsaw Home grown	Minneapolis No 2	Berlin Home grown	Groningen Home grown	Winnipeg No 4 Western	Chicago Feeding	Berlin Home grown	Liv. and London Dunbar 3 %	Winnipeg White Western No 2	Chicago White No 2	Buenos Aires La Plata	Berlin Home grown	Paris Home grown
Commercial year:													
1927-28	124 ¹ / ₂	106 ¹ / ₂	151 ¹ / ₂	118 ¹ / ₂	82 ¹ / ₂	86 ¹ / ₂	111	105 ¹ / ₂	61 ¹ / ₂	58 ¹ / ₂	54 ¹ / ₂	78 ¹ / ₂	71 ¹ / ₂
1928-29	93 ¹ / ₂	80	123 ¹ / ₂	99 ¹ / ₂	67 ¹ / ₂	56 ¹ / ₂	102 ¹ / ₂	94 ¹ / ₂	55 ¹ / ₂	47 ¹ / ₂	47 ¹ / ₂	69 ¹ / ₂	72 ¹ / ₂
1929-30	62 ¹ / ₂	80 ¹ / ₂	103 ¹ / ₂	64 ¹ / ₂	51 ¹ / ₂	57 ¹ / ₂	90 ¹ / ₂	65	55	44 ¹ / ₂	30 ¹ / ₂	54	46 ¹ / ₂
Monthly average:													
July, 1929	79 ¹ / ₂	106	120 ¹ / ₂	96 ¹ / ₂	78 ¹ / ₂	68 ¹ / ₂	95 ¹ / ₂	94 ¹ / ₂	59	48 ¹ / ₂	45	65 ¹ / ₂	66
October, "	69 ¹ / ₂	96 ¹ / ₂	108 ¹ / ₂	80 ¹ / ₂	64 ¹ / ₂	60 ¹ / ₂	98 ¹ / ₂	79 ¹ / ₂	68 ¹ / ₂	48	40 ¹ / ₂	59 ¹ / ₂	54 ¹ / ₂
January, 1930	65 ¹ / ₂	88 ¹ / ₂	97 ¹ / ₂	66	50 ¹ / ₂	61 ¹ / ₂	98 ¹ / ₂	67 ¹ / ₂	55 ¹ / ₂	45 ¹ / ₂	39 ¹ / ₂	48 ¹ / ₂	48 ¹ / ₂
April, "	64 ¹ / ₂	71 ¹ / ₂	100 ¹ / ₂	61	45	57 ¹ / ₂	94 ¹ / ₂	57 ¹ / ₂	51 ¹ / ₂	44 ¹ / ₂	28 ¹ / ₂	56 ¹ / ₂	40 ¹ / ₂
July, "	56 ¹ / ₂	54	104	47 ¹ / ₂	35 ¹ / ₂	48	94 ¹ / ₂	46	39 ¹ / ₂	36 ¹ / ₂	21	59 ¹ / ₂	40 ¹ / ₂
August, "	55 ¹ / ₂	59 ¹ / ₂	101 ¹ / ₂	57 ¹ / ₂	35 ¹ / ₂	52 ¹ / ₂	98 ¹ / ₂	49 ¹ / ₂	39 ¹ / ₂	40 ¹ / ₂	22 ¹ / ₂	65 ¹ / ₂	45 ¹ / ₂
September, "	53 ¹ / ₂	53	104 ¹ / ₂	48 ¹ / ₂	28 ¹ / ₂	50	96 ¹ / ₂	42 ¹ / ₂	31 ¹ / ₂	38 ¹ / ₂	20 ¹ / ₂	57 ¹ / ₂	46 ¹ / ₂
October, "	53 ¹ / ₂	49 ¹ / ₂	89 ¹ / ₂	40 ¹ / ₂	25 ¹ / ₂	43 ¹ / ₂	99 ¹ / ₂	38 ¹ / ₂	30 ¹ / ₂	36 ¹ / ₂	18 ¹ / ₂	51 ¹ / ₂	44 ¹ / ₂
November, "	54	42 ¹ / ₂	92	44	22 ¹ / ₂	45 ¹ / ₂	91	39 ¹ / ₂	26	33 ¹ / ₂	18 ¹ / ₂	49 ¹ / ₂	39 ¹ / ₂
December, "	54 ¹ / ₂	44 ¹ / ₂	93 ¹ / ₂	47 ¹ / ₂	22 ¹ / ₂	46 ¹ / ₂	99 ¹ / ₂	41 ¹ / ₂	25 ¹ / ₂	34 ¹ / ₂	15 ¹ / ₂	49 ¹ / ₂	41 ¹ / ₂

(1) Commercial year: August-July.

With the object of furnishing a documentation of the gravity and general character of the phenomenon, it has been considered of interest to combine in a series of tables the monthly averages of quotations for various agricultural products during 1930, compared with those for July and October 1929, and the yearly average for 1930 (or the agricultural season 1929-30) compared with the corresponding averages for 1929 and 1928 (or the agricultural seasons 1928-29 and 1927-28).

TABLE III. — *Maize, rice, and linseed prices, in American cents per bushel.*

PERIODS	MAIZE (56 lbs.) (1)				RICE (45 lbs.) (2)								LINSEED (56 lbs.) (2)			
	Braila Dumbrăve	Chicago No 2 Mixed Amer.	Buenos Aires Yellow Plate	Milan Home grown	London Italian good No 6 oiled	London American Blue Rose	London Burma, No 2	London Siam, No 1	London Siam, Garden No 1	Tokio Various qualities	Buenos Aires Current quality	Duluth No 1, Northern	Bombay Bold			
Commercial year :																
1927-28	106 ³ / ₄	97 ³ / ₄	80 ³ / ₄	138 ³ / ₄	191 ¹ / ₂	212 ³ / ₄	133 ³ / ₄	126 ³ / ₄	148 ³ / ₄	205 ³ / ₄	166 ³ / ₄	222 ³ / ₄	190 ³ / ₄			
1928-29	104 ³ / ₄	94 ³ / ₄	89 ³ / ₄	130 ³ / ₄	188 ³ / ₄	213 ³ / ₄	128 ³ / ₄	129 ³ / ₄	147 ³ / ₄	191 ³ / ₄	194 ³ / ₄	273 ³ / ₄	217 ³ / ₄			
1929-30	46 ³ / ₄	85 ³ / ₄	62	95 ³ / ₄	145 ³ / ₄	212 ³ / ₄	106 ³ / ₄	112 ³ / ₄	136 ³ / ₄	180 ³ / ₄	172 ³ / ₄	236	191 ³ / ₄			
Monthly average :																
July, 1929	119 ³ / ₄	100 ³ / ₄	89 ³ / ₄	122 ³ / ₄	185 ³ / ₄	224 ³ / ₄	132	n. q.	185	193 ³ / ₄	271 ³ / ₄	209 ³ / ₄				
October, "	61 ³ / ₄	96 ³ / ₄	84 ³ / ₄	112 ³ / ₄	170 ³ / ₄	213 ³ / ₄	138 ³ / ₄	141	n. q.	215 ³ / ₄	248	331	253 ³ / ₄			
January, 1930	43 ³ / ₄	85 ³ / ₄	64 ³ / ₄	102 ³ / ₄	167	209 ³ / ₄	116 ³ / ₄	117 ³ / ₄	138 ³ / ₄	189 ³ / ₄	194 ³ / ₄	307	230 ³ / ₄			
April, "	40 ³ / ₄	83 ³ / ₄	64 ³ / ₄	98 ³ / ₄	155 ³ / ₄	220 ³ / ₄	117 ³ / ₄	123 ³ / ₄	149 ³ / ₄	192 ³ / ₄	196 ³ / ₄	285 ³ / ₄	219 ³ / ₄			
July, "	51 ³ / ₄	81 ³ / ₄	54 ³ / ₄	90 ³ / ₄	140 ³ / ₄	225 ³ / ₄	112 ³ / ₄	113 ³ / ₄	147 ³ / ₄	205	156 ³ / ₄	209	184 ³ / ₄			
August, "	58 ³ / ₄	97 ³ / ₄	55 ³ / ₄	101 ³ / ₄	152 ³ / ₄	213 ³ / ₄	112 ³ / ₄	116 ³ / ₄	145 ³ / ₄	215 ³ / ₄	161 ³ / ₄	207 ³ / ₄	197 ³ / ₄			
September, "	48	94	50 ³ / ₄	91 ³ / ₄	n. c.	190 ³ / ₄	110	110	141	203 ³ / ₄	144 ³ / ₄	189 ³ / ₄	186 ³ / ₄			
October, "	34 ³ / ₄	83 ³ / ₄	42 ³ / ₄	74	127 ³ / ₄	102 ³ / ₄	98 ³ / ₄	100 ³ / ₄	n. q.	134 ³ / ₄	125 ³ / ₄	177 ³ / ₄	160 ³ / ₄			
November, "	29 ³ / ₄	74 ³ / ₄	34	69 ³ / ₄	123	181 ³ / ₄	88	n. q.	105 ³ / ₄	128 ³ / ₄	126	164	142 ³ / ₄			
December, "	32 ³ / ₄	70 ³ / ₄	33 ³ / ₄	67 ³ / ₄	119 ³ / ₄	178 ³ / ₄	80 ³ / ₄	88	97 ³ / ₄	127 ³ / ₄	96 ³ / ₄	159 ³ / ₄	134 ³ / ₄			

(1) Commercial year: November-October. — (2) Calendar year.

TABLE IV. — *Prices of fibres and of rubber, in American dollars per 100 lbs.*

PERIODS	COTTON (1)				FLAX (2)			HEMP (2)	MANILA HEMP(3)	JUTE (3)	RUBBER (3)	
	New Orleans : Middling	Liverpool : Am. Middling	Liverpool : M. g. Brooch f. g.	Liverpool : Sakellariadis f. g. f.	Riga : Livonie I.	Rotterdam : Dutch flax	London : Riga ZK	Italy : current quality	London : "J ₁ " grade	London : First Marks	London : Plantation, No 1 Crepe.	New York : Ribbon, smoked sheet
Commercial year :											per lb.	per lb.
1927-28	19.97	22.85	19.49	39.42	22.68	25.96	21.88	13.01	8.17	7.99	0.22	0.22
1928-29	18.98	21.35	17.60	36.84	...	22.33	17.97	11.91	8.04	7.39	0.21	0.20
1929-30	16.17	18.48	13.79	29.44	13.97	17.76	12.32	9.81	5.72	5.30	0.12	0.12
Monthly average :												
July, 1929	18.76	21.09	17.07	33.78	...	19.42	15.77	10.81	8.32	6.92	0.22	0.21
October, "	18.09	20.60	16.57	32.16	14.18	20.88	13.69	11.08	7.70	7.03	0.20	0.20
January, 1930	16.76	19.00	14.21	29.26	13.39	17.59	12.52	10.81	7.54	6.73	0.15	0.15
April, "	15.83	17.72	12.47	25.79	13.34	16.87	13.04	9.10	6.37	6.38	0.15	0.15
July, "	12.72	15.47	10.26	25.06	12.86	n. q.	12.21	8.04	5.21	5.45	0.11	0.11
August, "	12.09	14.09	8.92	23.22	12.60	n. q.	11.84	7.95	5.03	4.54	0.10	0.10
September, "	10.61	12.68	8.56	20.89	11.30	n. q.	9.17	7.66	4.79	3.55	0.08	0.08
October, "	10.45	11.88	8.56	19.61	10.42	n. q.	8.69	6.56	5.15	3.54	0.08	0.08
November, "	10.55	12.11	8.94	19.51	9.78	13.04	8.47	5.68	5.18	3.54	0.09	0.09
December, "	9.60	11.03	8.11	16.36	8.33	11.40	8.04	—	5.07	3.44	0.09	0.09

(1) Commercial year: August-July. — (2) Commercial year: October-September. — (3) Calendar year.

The monthly averages have, in general, been calculated from the prices quoted on the Friday of each week and the annual averages from the monthly averages.

For the purpose of facilitating comparison, all the prices have been converted to dollars per cental or bushel on the basis of the parity between the currency of the country and the American dollar in all cases where exchange fluctuations were minimum, and on the basis of the monthly average rates of exchange in cases where the movement of the rate of exchange showed fluctuations of some importance during the period under consideration.

TABLE V. — *Prices of various tropical products, in American dollars per 100 lbs.*

PERIODS	COTTON- SEED (1)	COPRA		COFFEE		CACAO	TEA	SUGAR	
	Alexandria	London: Ceylon:	New-York: Pacific	Rio de Janeiro: No 7 Rio	Santos: No 4 Santos	London: ACCTA	London: Indian, medium to good	London: Refined (duty paid)	New York: Cuba centrifugal 96° (c. & f.)
Yearly average:							per lb.		
1928	2.04	6.07	5.08	14.72	10.45	13.32	0.38	5.96	2.45
1929	1.78	5.26	4.45	13.72	18.72	10.21	0.36	5.11	1.90
1930	1.27	4.38	3.70	6.68	10.37	8.16	0.34	4.58	1.47
Monthly average:									
July, 1929	1.81	5.28	4.38	14.35	18.90	10.10	0.38	5.27	2.08
October, "	1.75	5.35	4.45	13.51	19.52	9.89	0.32	5.21	2.25
January, 1930	1.40	5.22	4.37	6.99	12.21	9.67	0.32	4.89	1.58
April, "	1.38	5.01	4.33	7.74	11.59	8.96	0.33	4.80	1.64
July, "	1.14	4.23	3.59	6.39	10.36	8.33	0.35	4.65	1.25
August, "	1.16	3.96	3.55	5.20	8.62	8.26	0.34	4.60	1.10
September, "	1.11	3.75	3.28	6.09	9.45	7.17	0.34	4.22	1.12
October, "	1.01	3.62	2.96	5.90	9.49	6.73	0.36	4.20	1.32
November, "	1.02	3.80	3.09	5.71	9.37	6.75	0.36	4.33	1.30
December, "	0.99	3.68	3.05	5.25	7.26	6.68	0.36	4.31	1.27

(1) Commercial year: November-October.

TABLE VI. — *Meat, wool, and silk prices, in American dollars per 100 lbs.*

PERIODS	BEEF					FRESH PORK (2)			MUTTON		WOOL	SILK
	Fresh			Other		Denmark	Berlin	Chicago	Fresh (1)		London: Victoria	Milan: unmanufactured
	Paris (1)	Berlin (2)	Chicago (2)	London: chilled	London: frozen				Paris	London		
Yearly average:												per lb.
1928	12.80	12.34	14.65	15.24	10.65	16.53	13.93	9.53	21.61	24.46	16.02	50.69
1929	15.46	12.28	14.03	15.64	11.41	19.33	17.16	10.26	25.39	23.35	15.73	38.53
1930	18.22	12.89	12.37	15.52	11.66	15.80	14.27	9.65	26.30	24.39	14.08	26.36
Monthly average:												
July, 1929	16.01	13.23	14.41	16.08	11.66	20.91	18.37	11.20	25.11	23.70	15.86	36.50
October, "	15.82	11.93	14.24	15.57	11.41	17.99	18.52	9.38	25.56	22.76	15.41	30.42
January, 1930	15.09	12.86	14.14	16.17	13.89	18.72	17.46	9.78	26.51	23.32	16.28	34.47
April, "	17.13	12.40	14.23	14.81	12.42	19.08	14.57	10.00	26.92	24.57	14.45	25.35
July, "	19.80	12.92	10.00	16.08	10.65	15.44	13.14	8.78	25.48	24.73	12.67	25.35
August, "	19.62	12.94	10.01	17.87	11.15	14.83	14.28	9.58	25.59	24.59	12.47	25.35
September, "	20.38	12.56	11.17	15.01	11.15	14.22	13.45	9.76	27.53	25.09	12.55	25.85
October, "	19.44	11.91	11.24	15.41	11.41	12.03	12.81	9.34	26.78	24.38	14.09	24.33
November, "	18.93	11.99	11.62	15.08	11.15	12.16	13.81	8.55	26.57	22.81	13.81	24.38
December, "	19.09	12.27	11.51	13.87	10.39	11.06	12.62	7.92	27.76	22.81	12.96	20.28

(1) Dead weight. — (2) Live weight.

TABLE VII. — *Butter, cheese, and egg prices, in American dollars per 100 lbs. or per 100.*

PERIODS	BUTTER (per 100 lbs.)						CHEESE (per 100 lbs.)						EGGS per 100	
	Copenhagen : Official quotation	Maastricht : Butter with quality mark.	Hamburg : S. H. Butter with quality mark	London : Argentine	London : Australian salted.	London : New Zealand, salted	Milan : Parmigiano Reggiano	Alkmaar : Edam, 40	Kempten : Emmentaler from the Allgäu	London : New Zealand	London : Danish	London : Dutch		
Yearly average :														
1928	38.17	39.02	40.02	37.37	37.08	39.09	25.95	18.20	25.12	23.03	3.67	3.66		
1929	36.83	38.11	38.43	37.03	38.24	38.3	25.85	17.17	23.12	20.73	—	3.95		
1930	29.78	30.99	31.70	29.51	29.49	29.91	27.89	14.01	20.96	17.85	3.21	3.46		
Monthly average :														
July, 1929	35.25	34.64	35.88	35.86	37.55	38.24	24.77	16.91	23.88	20.78	n. q.	3.33		
October, "	40.72	42.48	43.28	39.00	39.54	40.84	27.10	18.96	22.04	21.35	4.33	4.38		
January, 1930	34.76	37.38	35.18	34.67	35.01	35.54	27.16	16.63	22.15	19.59	3.46	4.21		
April, "	27.35	28.44	29.30	29.33	28.35	29.00	26.71	14.22	21.61	17.76	2.59	2.69		
July, "	30.16	31.72	32.38	29.87	30.85	30.85	30.74	14.99	21.18	17.98	2.96	3.06		
August, "	29.54	29.00	31.26	29.46	30.45	30.94	30.92	15.46	20.85	18.10	2.97	3.06		
September, "	29.90	30.63	31.74	28.24	28.57	28.89	26.26	14.72	20.31	16.96	3.11	3.26		
October, "	29.90	30.45	32.04	27.55	27.12	27.46	26.26	14.66	19.66	16.53	3.67	3.90		
November, "	27.23	29.72	31.86	25.91	25.20	25.69	26.26	14.49	19.66	16.53	4.55	4.82		
December, "	27.11	28.81	31.12	24.70	24.69	25.01	26.26	13.31	19.66	14.23	4.33	4.75		

In grouping the data for the same product on different markets, it must, of course, be borne in mind that the differences in prices are partly due to differences in the qualities to which the quotations refer.

Without entering into a detailed examination of the tables, as this would be outside the scope of the present study, which is only intended to give a review of the price situation of agricultural products, the following study is limited to drawing some general conclusions from the data grouped together.

For this purpose it is necessary to select quotations on those markets where the prices are not influenced by protective measures, and which therefore reflect the situation of world supply and demand more faithfully than those quoted on markets the prices of which are affected by tariff duties or other measures.

Taking into account, for every product considered, the quotations typical of one or of very few markets of the first group, which are the most suitable for indicating the real character of the world situation, the following percentage variations (see Table VIII) are noted in the average prices for December 1930 compared respectively with those for January 1930 and the year 1928 (or agricultural season 1927-28).

This summary table shows, in the first place, the general character of the fall in prices of agricultural products on the world market : it is only in a few isolated, exceptional cases that the quotations at the end of 1930 show small differences compared with those of the periods with which they are compared.

For the majority of products of the soil the decline in the course of the year ranges from 40 % to 50 % ; the reductions as compared with 1928 are in some cases over 70 % and only in relatively few cases are less than 50 %.

In general the decline was relatively less in livestock products for food but, the prices of chilled and frozen meat, pork, butter, and cheese, which were well maintained up to the beginning of 1930, registered a general and by no means slight decrease during the year. Greater stability was shown only by fresh meat and mutton and eggs and — the only exception amongst the products of the soil under consideration — tea, due in the last case to restriction by growers.

TABLE VIII. — *Fall of prices of different agricultural products.*

PRODUCTS, MARKETS AND DESCRIPTIONS	% fall in the prices of December 1930 compared with those of		PRODUCTS, MARKETS AND DESCRIPTIONS	% fall in the prices of December 1930 compared with those of	
	January 1930	1928 (or commer- cial season 1927-28)		January 1930	1928 (or commer- cial season 1927-28)
Wheat: Winnipeg, N. 1 Manitoba	57	62	Cotton: New Orleans, middling	48	52
Wheat: Buenos Aires, Barletta	52	57	Cotton: Liverpool, Broach m. g., f. g.	48	58
Rye: Minneapolis, N. 2	50	58	Cotton: Liverpool, Sakellaridis f. g. f.	44	58
Barley: Winnipeg, N. 4 Western	56	72	Flax: Riga, Livonie L.	38	63
London, Danubian 3 %	38	61	Manila Hemp: London, J 2 grade	33	38
Oats: Winnipeg, N. 2 White	55	59	Hemp: Italy, medium	48	56
Buenos Aires, Plata	48	72	Jute: London, "First Marks"	49	57
Maize: Braila, Danubian	25	69	Rubber: London	39	58
Buenos Aires, Yellow			Wool: London, Victoria	41	60
Plata	48	63	Silk: Milan, unmanufactured "Clas- siche"	35	49
Rice: London, Italian N. 6 good	28	37	Beef: London, chilled	14	9
London, N. 2 Burma	31	40	London, frozen	24	2
Linseed: Buenos Aires, Current quality	50	42	Pork: Denmark, fresh	41	33
Linseed: Bombay, bold	41	29	Mutton: London, chilled	20	19
Cottonseed: Alexandria	29	51	Butter: Copenhagen	22	29
Copra: London, Ceylon	30	39	London, New Zealand	30	36
Coffee: Santos, N. 4 Santos	41	63	Cheese: Alkmaar, 40 +	20	27
Cacao: London, Acra	31	50	London, New Zealand	27	38
Tea: London, Indian, medium to good	* (+12)	3	Eggs: London, Danish	0	7
Sugar: New York	36	48			

* Increase.

The decline in prices, is, as is well-known, a general phenomenon, due to economic, financial and monetary causes affecting all commodities to a greater or less extent. It is however, noticeable that the decline in general wholesale price index-numbers in the course of the year was only 15-20 % and from the beginning of 1928 to the end of 1930 about 20-25 %, that is, it has been of more modest dimensions than that in the majority of agricultural products, according to the percentage declines indicated in the preceding table. As regards these last, there have been, besides the general causes of depression, special causes of depression on the world market due to the supplies of many products being excessive relative to the possibilities of absorption.

In countries affected by protective measures the course of prices was less strictly related to that on the world market and the decline was in general less marked, as appears from a comparison between the different series of data presented in the separate tables.

Customs duties and other measures intended to maintain prices did not in the majority of cases, avail to prevent notable reductions in the course of the year, and at the end of the year prices were considerably below those of January. Thus, everywhere, albeit with varying intensity, prices of all agricultural products reflected the existing disequilibrium between world supplies and demand, a condition aggravated in many cases by the obstacles placed in the way of international trade.

MONTHLY REVIEW OF PRICES (1)

PRODUCTS 'MARKETS AND DESCRIPTIONS	Feb	Feb	Jan	Jan	Average (2)					Commercial Season	
	13,	6	30	23	Jan	Feb	Feb			1929 30	1928 29
	1931	1931	1931	1931	1931	1930	1929				
WHEAT											
Winnipeg No 1 Manitoba (cents p 60 lbs)	58 7/8	57 1/4	54 7/8	53 1/8	53 1/8	117 1/4	127 1/8	124 1/8	124		
Chicago No 2 Hard Winter (4) (cents p 60 lbs)	79 1/4	79	n 79	n 78 1/4	79 1/4	115 1/4	127 1/8	114 1/8	119 1/4		
Minneapolis No 1 Northern (cents p 60 lbs)	75 1/4	75 1/8	75 1/4	75 1/4	75 1/4	122 1/4	128 3/4	117 1/2	115 1/4		
New York No 2 Hard Winter (4) (cents p 60 lbs)	n q	n q	n q	n q	n q	119 1/4	141 1/8	121 7/8	131 1/2		
Buenos Aires (a), Barletta (80 kg p hectol — pesos paper per quintal)	6 20	6 00	6 15	6 10	6 20	10 95	10 04	10 65	9 98		
Karachi Karachi white 2 o barley 1 1/2 o dirt (rupees per 556 lbs)	n q	19-9-0	20 10 0	19-14-0	20 2-10	36-2 6	44 3 3	33-6 9	41 11 7		
Berlin Home grown (Reichsmarks p quintal)	26 60	26 60	26 50	26 10	25 82	24 30	21 52	20 33	21 68		
Lomburg c i f (Reichsmarks p quintal)											
No 3 Manitoba	(4) 12 50	(4) 12 21	(4) 11 83	(1) 11 40	(4) 11 30	20 48	22 70	21 30	21 50		
No 2 Hard Winter	n q	n q	n q	n q	n q	19 14	22 60	19 49	20 96		
Barusso (79 kg p hectol)	9 88	9 21	9 38	9 29	(6) 9 55	18 07	20 29	18 72	19 06		
Antwerp (Belgian francs p quintal)											
Home grown	75	74	76	78	81	14	17 1/2	154 1/2	162 1/2		
No 2 Hard Winter Gulf	115	114	111	113	105	172 1/2		171			
Paris Home grown 75 77 kg (francs p quintal)	178 25	177 75	176 20	172 25	173 10	129 50	139 05	139 42	105 35		
London Home grown (shillings per 504 lbs)	21/6	22/-	22/-	23/-	23 4	38/6	43 6	40/10	43/6		
London and Liverpool c i f shipping current mouth (shillings p 480 lbs)											
South Russian (on sample)	23/6	n q	19/-	14/-	19 3	n q	n q	n q	n q		
No 3 Manitoba	(4) 20/6	23/6	23/7 1/2	32/1 1/2	23 1	42/4	45 3	45/2	40/6		
No 2 Hard Winter	n q	n q	n q	n q	n q	40 10	n q	41/5	43/		
White Pacific	25/-	23/6	20/3	26/6	26 7	41/-	47 7	42/3	46/		
Rosaf (64 1/2 lbs) aftat	n 21/-	20/-	19/6	19/6	19/11	31/2	41 1	40/3	42/1		
Choice White Karachi	n q	n q	n q	n q	n q	43 3	n q	42/2	n q		
Australian	22/-	21/6	21 4	22/-	22/11	41 7	47	43/6	45 11		
Milan (b) Home grown soft (lirs p quintal)	103 50	107 00	105 30	105 50	104 20	132 50	13 50	131 31	131 38		
Genoa c i f (shillings p metric ton) La Plata	94/-	n 9/-	n 93/6	94/-	93/8	178/3	190 9	184/6	192/10		
RYE											
Minneapolis No 2 (cents per 56 lbs)	37 1/2	36 1/2	36	34	38	78	101	80 1/2	99		
Berlin Home grown (Reichsmarks per quintal)	15 55	15 60	15 70	15 75	15 54	16 0	20 64	17 04	20 47		
Hamburg c i f La Plata 74 75 kg (R M p 100 kg)	n q	n q	n q	n q	n q	14 4	20 65	14 57	19 72		
Groningen (c) Home grown (florins per quintal)	3 85	3 85	4 10	4 25	7 4 31	5 24	9 64	6 33	9 74		
BARLEY											
Winnipeg No 4 Western (cents p 48 lbs)	18 7/8	18 1/2	17 1/4	16 1/2	19	46 3/4	72 1/2	51 1/2	67 1/2		
Chicago Feeding (cents per 48 lbs)	44	43	46	43	42 1/2	60	60 1/4	57 1/4	56 7/8		
Berlin Home grown, fodder (Reichsmarks per quintal)	19 70	19 70	19 70	19 25	19 10	14 42	19 72	17 40	19 73		
Antwerp Danube (francs per quintal)	65	64	65	67	66 1/2	102 1/2	104 1/2	107 1/2	154 1/2		
London English malting (shillings p 448 pounds)	37/6	36/6	39/6	37/-	37/4	39/4	54/-	39/-	47 8		
London and Liverpool, c i f, parcels (shillings per 400 lbs)											
Danubian 3 %	n q	n q	n q	n q	n q	21/1	n q	22/3	32/6		
Russian (Avoft-Black sea)	13/6	12/9	12/3	12/3	12/7	26/1	n q	18/11	n q		
Canadian Western, No 4	14 1 1/2	(8) 13/6	(8) 13/6	(8) 14 1/4	(8) 14/9	23/4	34/4	25/10	29 4		
Californian malting (shillings p 448 lbs)	(9) 25/-	(9) 25/3	27/-	27/-	26 5	30/11	42/-	32 6	36/9		
Maroccan	n q	n q	n q	n q	n q	31/7	n q	24/2	29 8		
Groningen (c) Home grown winter (fl p quintal)	4 55	4 00	4 60	4 60	(10) 4 60	6 29	10 00	7 55	9 07		

(a) Thursday prices — (b) Saturday prices — (c) Prices of preceding Tuesday

(1) All quotations are, unless otherwise stated, for spot. — (2) The monthly averages are based on Friday quotations the annual averages on the monthly. — (3) Quoted formerly as No 1 Western. — (4) No 3 Manitoba. — (5) January, 16 11 11 — (6) January, 16 9 45. — (7) January, 15 4 40 — (8) No 3 Western. — (9) Shipping March April. — January, 15 4 75

PRODUCTS, MARKETS AND DESCRIPTION	Feb.	Feb.	Jan.	Jan.	Average (1)					
	13,	6,	30,	23,	Jan.	Feb.	Feb.	Commercial		
	1931	1931	1931	1931	1931	1930	1929	Season	1929-30	1928-29
OATS.										
Winnipeg: No. 2 White (cents per 34 lbs.) . . .	27 7/8	25 5/8	24 1/8	25	27 1/8	60	73 1/8	58 1/8	58 7/8	
Chicago: No. 2 White (cents per 32 lbs.) . . .	33 1/8	33 1/8	82 1/2	32 1/2	32 3/4	44 3/8	53 3/4	44 1/8	47 3/4	
Buenos Aires (a): Current quality (pesos paper per quintal)	3.85	3.10	3.10	3.10	3.09	4.85	7.82	5.30	7.71	
Berlin: Home grown (Reichsmarks per quintal) . .	14.10	14.15	14.35	14.25	14.22	12.81	20.30	15.62	19.08	
Paris: Home grown, black and other (francs per quintal)	79.75	79.50	76.00	72.75	74.75	73.05	131.25	81.15	127.85	
London: Home grown white (shillings per 336 lbs.)	17/6	17/6	17/6	17/6	17/4	19/-	29/-	21/-	25/5	
London and Liverpool c. i. f., parcels (shillings p. 320 lbs.):										
Danubian (39-40 lbs.)	n. q.	n. q.	n. q.	n. q.	n. q.	n. q.	n. q.	(2)n. 16/4	n. q.	
Plate (f. a. q.)	9/6	9 1/2	9/-	9/3	9/2	14/1	24/7	16/1	23/0	
White clipped American	n. q.	n. q.	n. q.	n. q.	n. q.	n. q.	n. q.	n. q.	24/2	
Chilian Tawny	10/9	11/-	11/-	n. q.	11/3	(3)15/4	20/2	17/3	24/2	
Milan (b): spot (liras per quintal):										
Home grown	73.50	73.50	73.50	73.50	73.50	83.75	110.00	80.75	103.70	
Foreign imported	57.50	55.50	54.50	54.50	55.10	70.00	102.85	74.25	98.90	
MAIZE.										
Braila: Danube (lei per quintal)	205 1/2	191 1/2	193	195	190 1/4	276	765	300	687	
Chicago: No. 2 Mixed American (cents per 56 lbs.) .	61	62 1/4	65	62 1/4	66	84 1/2	97 1/2	85 7/8	91 1/4	
Buenos Aires (a): Yellow Plate (pesos paper per quintal)	3.85	3.70	3.70	3.70	3.76	6.30	9.04	6.17	8.35	
Antwerp, spot (Belgian francs per quintal):										
Bessarabian	65	62	62	61	64 1/2	n. q.	171 1/2	97 1/2	n. q.	
Yellow Plate	64	60	60 1/2	62 1/2	61 1/2	106	170	100 1/2	155 1/4	
London and Liverpool, parcels, c. i. f. (shillings per 480 lbs.):										
Danube	n. q.	n. q.	n. q.	n. q.	n. q.	(2)25/7	n. q.	24/11	n. q.	
Yellow Plate	15/-	14/-	14/-	14/6	14/8	25/1	42/10	25/3	38/3	
No. 2 White African	n. q.	n. q.	n. q.	n. q.	n. q.	27/2	42/9	29/-	38/8	
Milan (b): Home grown (liras per quintal) . . .	49.50	49.50	49.50	48.50	48.70	73.25	100.10	71.35	97.90	
RICE (CLEANED).										
Milan (b): Maratelli (lire per quintal)	110.00	110.00	110.00	110.00	107.00	173.35	195.00	152.15	195.70	
Rangoon: No. 2 Burma (rupees per 7500 lbs.) . .	235	250	260	n. q.	260	383 3/4	441	393 3/4	462 1/4	
Saigon (Indochine) piastres (4 p. quintal):										
No. 1 Round white (25 % broken)	7.17	6.80	7.20	6.96 (5)	7.28	11.88	10.59	...	11.58	
No. 2 Japan (40 % broken)	6.51	6.43	6.88	6.63 (6)	6.92	11.47	9.93	...	11.08	
London (a): c. i. f. (shillings per 112 lbs.):										
Spanish Belloch No. 3 oil	11/6	11/7 1/2	11/7 1/2	11/7 1/2	11/5	15/3	19/10	14/1	17/11	
Italian good No. 6 oil	11/9	12/3	12/3	11/9	11/8	16/8	19/6	14/11	18/9	
American Blue Rose	18/10 1/2	18/10 1/2	18/10 1/2	18/10 1/2	18/5	23/6	21/4	21/9	21/10	
Burma, No. 2	7/6	7/10 1/2	8/1 1/2	8/2	8/1	11/-	13/1	10/11	13/2	
Saigon, No. 1	7/10 1/2	7/9	8/-	7/10 1/2	7/11	11/10	13/4	11/6	13/3	
Siam, Garden, No. 1	9/7 1/2	9/10 1/2	10/-	10/1 1/2	10/1	13/11	15/3	14/-	15/1	
Tokio: Various qualities (yens per koku)	17.50	17.70	17.70	17.40	...	27.40	28.50	25.57	29.06	
LINSEED.										
Buenos Aires (a): Current quality (pesos paper per quintal)	10.65	10.65	10.65	10.60	10.46	19.42	15.41	17.10	18.20	
Antwerp: Plate (Belgian francs p. quintal) . . .	166	161	161	161	164 1/2	306 1/2	279 1/2	284 1/4	316 1/4	
Hull, c. i. f.: Plate (p. sterling p. l. ton) . . .	8-12-0	8-7-0	8-5-0	8-5-0	8-6-0	17-5-4	15-17-2	15-0-5	18-5-0	
London, c. i. f.: Bombay bold (p. st. per long ton).	n. q.	n. q.	12-5-0	12-0-0	12-1-0	19-11-10	19-13-1	17-14-4	20-16-1	
Duluth: No. 1, Northern (cents p. 56 lbs.) . . .	(7) 154 1/4	(7) 154 1/4	(7) 152	(7) 158	(7)157 1/2	303 3/4	217 1/4	236	273 1/4	

(a) Thursday prices. — (b) Saturday prices.

(1) The monthly averages are based on Friday quotations, the annual averages on the monthly. — (2) Weight not indicated. — (3) March-April delivery. — (4) Actual rate of change: 1 piastre = 38 1/4 ¢. — (5) 2-1: 7.58; 9-1: 7.17; 16-1: 7.41 — (6) 2-1: 7.25; 9-1: 6.84; 16-1: 7.00. — (7) May delivery.

PRODUCTS, MARKETS AND DESCRIPTION	Feb.	Feb.	Jan.	Jan.	Average (1)					
	13,	6,	30,	23,	Jan.	Feb.	Feb.	Commercial		
	1931	1931	1931	1931	1931	1930	1929	Season		
									1929-30	1928-29
COTTONSEED.										
Alexandria : Sakellaridis (piastres per ardeh)	54.1	53.1	53.5	53.0	52.5	70.5	98.2	67.9	95.4	
Hull : Sakellaridis (p. sterl. p. long ton)	5-15-0	5-13-0	5-17-6	5-15-0	5-15-0	7-5-0	9-15-7	6-18-2	9-12-2	
COTTON.										
New Orleans : Middling (cents per lb.)	10.67	10.38	10.16	10.03	9.88	15.10	18.96	16.17	18.88	
New York : Middling (cents per lb.)	11.00	10.75	10.50	10.60	10.32	15.41	20.12	16.60	19.09	
Bombay : M. g. Broach f. g. (rupees per 784 lbs.)	206	205	188	191	181 1/4	205	255 1/4	283 1/2	340 1/4	
Alexandria (a) (talaris per kantar) :										
Sakellaridis f. g. f.	17 1/2	16 1/4	16 1/4	15 1/4	14 1/4	26 1/2	36	28 1/4	35 1/4	
Ashmouni (Upper Egypt) f. g. f.	12 1/4	11 1/4	11 1/2	11 1/4	11	19 1/4	22 1/4	19 1/4	22 1/4	
Bremen : Middling (U. S. cents per lb.)	11.98	11.58	11.26	11.40	11.18	17.14	21.02	18.27	21.19	
M. g. Broach fully good (pence per lb.)	n. 5.05	n. 5.05	n. 4.75	n. 4.75	n. 4.64	n. 6.34	n. 8.32	n. 6.83	n. 8.27	
Le Havre : Middling, Gulf (francs pr 50 kilogr.)	365	355	348	348	341	524	633	545	624	
Liverpool (pence per lb.) :										
Middling fair	n. 7.05	n. 6.92	n. 6.83	n. 6.78	n. 6.67	n. 9.86	n. 11.84	n. 10.39	n. 11.69	
Middling	5.85	5.72	5.63	5.63	5.48	8.56	10.40	9.09	10.53	
São Paulo good fair	6.15	6.02	5.93	5.88	5.77	8.71	10.80	9.02	10.91	
M. g. Broach fully good	n. 4.48	n. 4.40	n. 4.28	n. 4.23	n. 4.07	n. 6.14	n. 8.62	n. 6.80	n. 8.08	
Sakellaridis fully good fair	9.35	9.00	8.85	8.55	8.25	13.62	18.01	14.52	18.17	
BUTTER.										
								1930	1929	
Copenhagen (a) (Kr. p. 100 kg.)	238	234	224	214	(2)220	280	324	245	303	
Maastricht, auction (b) : Dutch (gulden p. 50 kg.,	1.68	1.68	1.60	1.57	(3) 1.62	2.03	2.29	1.70	2.09	
Hamburg, auction (b) : Schleswig-Holstein butter										
with quality mark (R. M. per 50 kg.)	150.35	148.04	140.13	130.14	141.27	172.03	190.50	146.67	178.03	
Kempten (b) : Allgäu butter (Pfennige p. half kg.)	127	122	116	116	118 1/2	141	167	128	159	
London (c) (shillings p. cwt.) :										
British blended	140/-	135/4	135/4	135/4	135/4	182/-	210/-	158/8	196/-	
Danish	146/-	144/-	138/-	128/-	141/2	177/6	185/6	153/6	186/6	
Irish creamery salted	n. q.	n. q.	n. q.	n. q.	n. q.	n. q.	n. q.	134/10	179/4	
Dutch	150/-	140/-	140/-	140/-	141/2	182/6	207/-	151/11	182/4	
Argentine	119/-	118/-	118/-	118/-	117/10	156/6	187/-	135/10	174/1	
Siberian	n. q.	n. q.	n. q.	n. q.	n. q.	149/6	n. q.	...	167/2	
Australian salted	120/-	117/-	117/-	118/-	118/10	155/-	188/-	135/9	176/-	
New Zealand salted	122/-	120/-	120/-	122/-	121/5	157/-	187/6	137/8	178/9	
CHEESE.										
Milan (lire per quintal) :										
Parmigiano-Reggiano, 1st quality of last year's										
production	1,100	1,100	1,100	1,100	1,100	1,137	1,037	1,160	1,074	
Green Gorgonzola, mature, choice	600	600	600	600	600	747	897	671	829	
Rome : Roman pecorino (lire p. quintal)	1,137	1,087	1,087	1,087	1,093	1,233	1,610	1,207	1,542	
Alkmaar : Edam 40 + 40% butterfat, with the										
country's cheesemark, factory cheese, small:										
florins, p. 50 kg.)	33.00	33.50	n. q.	33.50	(4)32.87	43.25	46.75	40.88	47.10	
Gouda (5) : Gouda 45 + (whole milk cheese, with										
the country's cheesemark, home made; florins,										
p. 50 kg.)	40.00	39.50	40.00	41.00	(6)38.80	48.75	54.75	45.56	52.45	
Kempten (C) : Pfennige per half kg.) :										
Softcheese, green (20 % butterfat)	23 1/2	23 1/2	23 1/2	25 1/2	27	24	28 1/2	27	35	
Emmenthal from the Allgäu (whole milk cheese)										
1st quality	98 1/2	98 1/2	98 1/2	98 1/2	98 1/2	(7)102 1/2	(7)105 1/2	(7) 97	(7)107	
London (c) (shillings per cwt.) :										
English Cheddar	94/-	94/-	95/-	95/-	95/-	113/-	139/-	103/4	121/9	
Canadian	82/-	81/-	81/-	81/6	81/8	103/6	113/6	93/11	107/8	
New Zealand	56/-	59/-	61/-	62/6	63/6	82/6	96/3	82/2	95/5	
Liverpool (c) : Engl. Cheshire, ungraded (sh. p. cwt.)	95/8	95/8	95/8	95/8	93/10	130/8	135/4	96/5	111/9	

(a) Thursday prices. — (b) Wednesday prices. — (c) Average prices for weeks ending on preceding Wednesday.

(1) The monthly averages are based on Friday quotations, the annual averages on the monthly. — (2) January, 15 : 214. — (3) January, 14 : 1.57. — (4) January, 16 : 32.00. — (5) Indicated formerly as : Bodegraven. — (6) January, 16 : 39.00. — (7) Average price for all qualities.

THE PRICES OF AGRICULTURAL PRODUCTS IN JANUARY, 1931

In the following pages the index-numbers of prices of agricultural products and other price indices of interest to the farmer are given as published in the different countries. The indices collected together have been obtained according to different methods and criteria in the countries. A detailed account of the items included in each series and the system of construction of the index-numbers may be found in the volume published especially for this purpose by the Institute, entitled « Index-numbers of prices of agricultural products and other price indices of interest to the farmer ». We refer the reader to this volume for an exact interpretation of the significance of the different series of data.

Owing to the substantial divergence which often exists in the value and significance of the indices available, much care is advisable in their utilization from an international point of view. For this reason it has been considered opportune to reproduce all the data in their original form only; without attempting to formally unite them. The latter process, by a comparison of often heterogeneous data, might easily lead to the drawing of erroneous relations and conclusions.

But in addition to the original data, and subject to the above comments, a summary table is given below.

Countries	Percentage variations in the index-numbers for January, 1931			
	compared with those for December, 1930		compared with those for January, 1930	
	Index-numbers of prices of agricultural products	General index-numbers of prices	Index-numbers of prices of agricultural products	General index-numbers of prices
Germany	— 3.1	— 2.2	— 12.4	— 12.9
England and Wales	— 3.2	— 2.1	— 12.2	— 20.2
Argentina	— 2.4	—	— 35.1	—
Canada	— 2.1	— 1.4	— 40.6	— 19.8
Estonia	— 1.4	—	— 20.2	—
United States ^{a)}	— 3.1	—	— 29.9	—
Finland ^{b)}	— 2.3	— 1.8	— 27.2	— 17.6
Hungary	— 1.4	0	— 10.8	— 8.5
Italy	— 1.3	+ 1.1	— 16.8	— 14.2
New Zealand	— 2.5	— 1.8	— 25.1	— 20.2
Netherlands	— 4.5	—	— 30.6	—
Poland	0	— 1.9	— 17.4	— 19.9
Yugoslavia	— 10.6	— 5.6	— 24.5	— 18.0
	c) — 1.1	— 2.9	c) — 31.4	— 19.1
	d) — 5.1		d) — 16.5	

a) "Bureau of Agricultural Economics". — b) "Bureau of Labor". — c) Products of the soil. — d) Animal products.

INDEX-NUMBERS OF PRICES OF AGRICULTURAL PRODUCTS AND OF COMMODITIES BOUGHT BY THE FARMER *

COUNTRIES AND CLASSIFICATION	January	Dec.	Nov.	Oct.	Sept.	August	January	January	Year	
	1931	1930	1930	1930	1930	1930	1930	1929	1930 (1)	1929
GERMANY (Statistisches Reichsamt) 1913 = 100.										
Foodstuffs of vegetable origin	111.6	111.3	110.9	108.8	110.7	124.0	117.2	120.8	115.3	126.3
Livestock	97.5	104.4	108.2	104.7	108.2	111.8	127.0	118.0	112.4	126.0
Livestock products	110.4	126.0	131.3	127.5	124.6	121.0	133.7	147.2	121.7	142.1
Feeding stuffs	90.9	91.1	87.0	87.2	90.8	100.4	98.3	138.3	93.2	125.9
Total agricultural products	106.7	110.4	112.0	109.3	113.5	116.6	121.8	131.7	113.1	130.2
Fertilizers	82.3	80.5	80.4	80.4	80.0	70.1	85.2	86.5	82.4	84.5
Agricultural dead stock	134.9	136.0	137.4	138.6	139.1	139.4	141.0	141.4	139.4	141.3
General index-numbers	115.2	117.8	120.1	120.2	122.8	124.7	132.3	138.0	124.6	137.2
ENGLAND AND WALES (Ministry of Agriculture) Average of corresponding months 1911-13 = 100.										
Agricultural products	130	126	129	120	142	135	148	145	134	144
Feeding stuffs	78	81	78	82	90	90	115	150	95	139
Fertilizers	102	101	100	99	99	99	102	99	101	100
General index number (2).	100.1	102.2	104.2	106.4	106.8	108.5	125.4	137.6	113.1	135.3
ARGENTINA (Banco de la Nación Argentina) 1926 = 100.										
Cereals and linseed	53.6	56.0	50.8	70.7	77.9	87.2	94.3	101.5	82.3	100.4
Meat	91.0	90.5	99.3	109.6	114.8	118.0	110.8	107.3	110.9	113.0
Hides and skins	69.1	65.6	70.4	72.3	79.6	67.8	79.1	118.4	71.6	95.0
Wool	50.6	51.8	57.3	62.2	61.9	85.1	77.1	120.5	67.4	103.5
Dairy products	68.7	68.7	72.6	78.5	80.3	73.7	96.0	105.1	82.4	105.9
Forest products	108.7	103.7	108.7	108.7	107.7	106.9	111.8	109.7	107.9	111.5
Total agricultural products	61.7	63.2	67.9	77.1	82.8	89.3	95.0	105.2	85.5	102.6
CANADA (Internal Trade Branch of the Dominion Bureau of Statistics) 1926 = 100.										
Field products (grain, etc.)	42.9	43.6	49.3	55.1	59.3	67.8	91.7	85.3	70.4	93.8
Animals and animal products	91.3	93.6	96.5	98.9	93.6	91.1	121.0	112.8	103.1	112.5
Total Canadian farm products	61.0	62.3	67.0	71.5	72.1	76.6	102.7	95.6	82.7	100.8
Fertilizers	88.9	90.9	90.9	90.8	91.5	91.5	83.5	96.7	88.6	92.6
General index-number	70.7	77.8	79.8	81.4	82.5	84.1	95.6	94.0	86.0	95.6
ESTONIA (Central Bureau of Statistics) 1922 = 100.										
Commodities imported	86	83	88	90	74	75	91	98.6	83	94.6
Commodities exported	64	68	72	72	85	84	107	124.5	88	112.8
Agricultural products imported and exported	71	70	74	75	78	78	89	114.2	84	105.7

* For an explanation of the method of calculation of the index-numbers, reference should be made to the Institute's publication "Index-numbers of Prices of Agricultural Products and other Price-indices of interest to the Farmer" (Rome, 1930).
(1) Most data for 1930 are provisional. — (2) Calculated by the "Statist", reduced to base-year 1913 = 100.

COUNTRIES AND CLASSIFICATION	January	Dec.	Nov.	Oct.	Sept.	August	January	January	Year	
	1931	1930	1930	1930	1930	1930	1930	1929	1930 (1)	1929
UNITED STATES (Bureau of Agricultural Economics) Average 1909-10 to 1913-14 = 100.										
Cereals	77	80	80	92	100	101	118	115	100.4	121
Fruits and vegetables	108	108	114	127	148	149	167	109	158	136
Meat animals	112	112	118	123	128	119	140	140	134	156
Dairy products	107	117	124	125	123	117	135	145	123	140
Poultry and poultry products	110	127	146	129	125	107	178	161	126	150
Cotton and cottonseed	72	73	80	76	83	94	128	148	102	145
Total agricultural products	94	97	103	106	111	108	134	138	117	138
Commodities purchased by farmers (2) . . . . .	...	149	149	149	149	149	154	155	151	155
Agricultural wages (2)	—	120	—	—	150	—	150	162	—	170
UNITED STATES (Bureau of Labor) 1926 = 100.										
Grains	62.4	64.0	64.0	72.1	77.0	80.4	93.8	98.3	78.6	97.
Livestock and poultry	75.2	76.3	77.7	82.4	88.0	84.6	100.5	102.1	89.2	106.
Other farm products	70.0	78.1	85.4	86.3	86.4	86.7	103.9	113.3	91.3	106.6
Total farm products	73.5	75.2	79.3	82.6	85.3	84.9	101.0	105.0	88.5	104.9
Agricultural implements	94.7	94.9	94.9	94.9	94.9	94.9	96.1	98.8	95.1	97.0
Fertilizer materials	81.4	81.4	82.1	83.6	83.1	83.3	80.8	94.6	85.4	92.1
Mixed fertilizers	90.4	90.6	91.1	92.9	92.5	92.7	97.1	97.1	93.6	97.2
Cattle feed	75.0	78.2	83.0	89.6	93.6	104.8	113.5	134.8	90.8	121.6
Non-agricultural commodities	78.2	79.4	80.9	82.8	84.0	83.8	91.4	94.9	85.9	94.4
General index-number	77.0	78.4	80.4	82.6	84.2	84.0	93.4	97.2	86.1	96.5
FINLAND (Central Bureau of Statistics) 1926 = 100.										
Cereals	75	72	71	68	69	74	82	104	76	98
Potatoes	68	59	51	51	54	66	97	143	76	148
Fodder	59	58	58	57	60	67	67	76	62	60
Meat	74	72	70	77	85	92	92	107	88	103
Dairy products	73	74	79	83	88	88	93	103	84	103
Total agricultural products	74	73	74	75	78	83	88	105	82	100
General index-number	86	86	87	86	88	89	94	100	90	98
HUNGARY (Central Bureau of Statistics) 1913 = 100.										
Agricultural and livestock products	79	78	80	83	80	81	95	130	—	—
General index-number	91	90	92	94	92	93	106	132	—	—
ITALY (Consiglio Provinciale dell'Economia di Milano) 1915 = 100.										
National agricultural products	347.90	356.83	373.77	390.97	409.93	413.48	464.40	536.31	413.39	508.7
General index-number	301.86	308.63	379.03	380.00	398.30	402.58	453.21	496.35	411.04	480.69
NEW ZEALAND (Census and Statistics Office) Average 1909-13 = 100.										
Dairy produce	98.8	102.6	104.8	110.2	118.7	123.9	135.9	152.8	120.9	145.7
Meat	147.0	160.0	146.5	143.7	153.3	154.3	176.2	192.8	161.6	170.9
Wool	62.3	59.3	79.8	80.2	95.5	102.4	126.5	188.6	95.7	188.6
Hides, skins, and tallow	93.2	122.6	98.9	112.1	104.2	158.4	159.2	108.9	142.1	178.9
Miscellaneous	113.8	129.8	126.0	114.7	180.9	112.0	131.5	152.1	129.0	146.7
Total agricultural products	96.7	101.3	107.4	114.3	117.8	131.5	139.3	170.3	124.8	161.3

(1) Most data for 1930 are provisional. — (2) 1910-14 = 100.

COUNTRIES AND CLASSIFICATION	Jan.	Dec.	Nov.	Oct.	Sept.	August	Jan.	Jan.	Year	
	1931	1930	1930	1930	1930	1930	1930	1929	1930 (1)	1929
NORWAY (Kgl. Selskap for Norges Vel.) Average 1909-14 = 100.										
Cereals	102	99	101	109	118	125	142	165	(2) 155	(2) 182
Potatoes	180	158	155	172	200	177	110	143	(2) 120	(2) 231
Pork	89	98	102	98	96	95	140	164	(2) 141	(2) 157
Other meat	104	103	192	193	203	220	200	175	(2) 199	(2) 183
Eggs	107	146	179	151	124	118	126	149	(2) 135	(2) 150
Dairy products	139	150	158	158	157	157	165	171	(2) 161	(2) 178
Concentrated feeding stuffs	107	111	115	118	122	122	141	159	(2) 148	(2) 167
Maize	89	93	97	107	114	114	133	162	(2) 148	(2) 164
Fertilizers	90	95	101	106	99	102	106	101	(2) 103	(2) 104
NETHERLANDS (Directie van den Landbouw) Average 1924-25 to 1928-29 = 100.										
Products of the soil	62	59	61	68	73	76	61	79	(3) 68	(3) 87
Animal products	74	74	77	80	83	86	94	97	(3) 95	(3) 98
Total agricultural products	71	71	73	77	81	83	86	92	(3) 88	(3) 95
Agricultural wages	100	100	100	100	100	100	100	100	(3) 100	(3) 100
General index-number (4)	71.0	72.4	74.4	75.1	75.8	77.1	88.6	98.8	79.2	96.1
POLAND (Central Bureau of Statistics) 1927 = 100.										
Products of the soil	44.3	46.4	47.6	45.8	49.9	56.4	57.9	80.8	52.2	73.1
Products of agricultural industry	59.3	63.6	65.4	63.1	64.9	70.2	73.6	83.2	69.9	80.0
Total products of plant origin	51.5	54.6	56.1	54.0	57.1	63.2	64.8	82.1	60.6	76.9
Animals	54.9	68.6	72.7	77.8	79.9	79.9	91.9	89.6	82.3	98.4
Dairy products	77.5	88.9	97.0	88.2	79.0	72.4	91.6	116.9	81.3	102.9
Total products of animal origin	65.1	78.2	84.0	82.4	79.6	76.5	91.8	100.9	81.9	100.2
Total agricultural products	56.5	63.2	66.2	64.3	65.5	68.2	74.8	89.5	68.5	85.7
Fertilizers	124.7	124.7	124.7	126.2	126.2	126.2	130.6	118.2	121.7	126.5
Industrial products	86.0	87.8	88.9	90.6	91.8	93.2	99.1	104.0	94.2	103.3
General index-number	72.3	76.6	78.6	78.4	79.6	81.8	88.2	97.5	82.4	95.7
YUGOSLAVIA (National Bank of the Kingdom of Yugoslavia) 1926 = 100.										
Products of the soil	71.7	72.5	71.4	77.3	78.0	93.9	104.5	137.5	80.3	118.6
Animal products	82.0	86.4	95.1	93.3	95.6	96.7	98.2	102.5	96.3	107.2
Industrial products	72.8	75.2	74.8	75.4	78.2	97.7	86.6	94.4	81.8	92.6
General index-number	75.0	78.0	79.2	80.9	82.8	87.7	93.6	104.4	86.6	100.6

(1) Most data for 1930 are provisional. — (2) Agricultural year April 1-March 31. — (3) Agricultural year July 1-June 30. —
(4) Calculated by the Central Statistical Bureau of the Netherlands, reduced to the base 1925-1929 = 100.

RATES OF FREIGHT

(Rates for full cargoes).

VOYAGES	Febr.,	Febr.,	Jan.,	Jan.,	Average				Commercial Season	
	13,	6,	30,	23,	Jan.,	Febr.,	Febr.,			
	1931	1931	1931	1931	1931	1930	1929			
SHIPMENTS OF WHEAT AND MAIZE.									1929-30	1928-29
Danube to Antwerp/Hamburg (shill. p. 2240 lbs.)	n. q.	n. q.	n. q.	n. q.	n. q.	n. q.	n. q.	15/8	n. 14/	
Black Sea to Antwerp/Hamburg	11/-	11/-	11/-	11/3	10/11	n. q.	n. q.	n. q.	n. q.	
St. John to Liverpool (1)	1/6	1/6	1/6	1/6	1/6	1/4	2/4	1/5	3/	
Montreal to United Kingdom	n. q.	n. q.	n. q.	n. q.	n. q.	n. q.	n. q.	1/10	2/	
Gulf to United Kingdom (shill. per 480 lbs.)	(1) 1/9	(1) 1/9	(1) 1/9	(1) 1/9	(1) 1/9	2/3	3/-	2/6	3/	
New York to Liverpool (1)	1/6	1/6	1/6	1/6	1/6	1/4	2/2	1/6	2/	
Northern Range to U.K. and Continent	1/10	1/10	1/10	1/10	1/8	1/9	3/3	1/9	2/	
North Pacific to United Kingdom (shill. per 2240 lbs.)	22/6	22/6	22/6	22/6	22/6	18/4	31/	22/7	30/7	
Vancouver to Yokohama (1) (dollars p. sh. ton)	2.75	2.75	2.75	2.75	2.78	2.50	4.00	2.78	3/	
La Plata Down River (2) to U. K./Continent	17/3	17/6	15/6	16/-	16/2	10/5	25/-	12/8	22/	
La Plata Up River (3) to U. K./Continent (shill. per 2240 lbs.)	19/3	19/6	17/3	18/-	18/-	11/10	26/6	14/4	23/	
Katachi to U. K./Continent (4)	20/10	20/10	20/10	20/10	20/0	n. q.	21/9	n. 15/4	22/-	
Western Australia to U.K./Continent	30/-	30/-	30/-	30/6	30/2	21/7	38/3	25/7	38/7	
SHIPMENTS OF RICE.									1930	1929
Saigon to Europe (shill. per 2240 lbs.)	n. q.	n. 25/-	n. 25/-	n. 25/-	n. 23/6	n. 22/-	n. 30/6	...	...
Burma to U.K./Continent	22/0	22/4½	23/-	23/6	23/-	18/-	28/3	n. 17/8	n. q.	

(1) Rates for parcels by liners. — (2) "Down River" includes the ports Buenos Aires and La Plata. — (3) "Up River" includes the ports on the Paraná River as far as San Lorenzo. Cargoes from ports beyond San Lorenzo (Colastine, Sant-Pé and Paraná) at subject to an extra rate of freight. — (4) The original data being quoted in "scale terms", 10% is added to arrive at freights per 2,240 lbs.

IMPORT DUTIES ON CEREALS AND FLOUR

CHANGES TO BE MADE IN THE DUTIES PUBLISHED ON PAGE 62 OF THE CROP REPORT OF JANUARY 1931.

COUNTRY	Product	Date when enforced	Original datum per metric quintal	Datum in Amer. cents per bushel or barrel
Yugoslavia	Wheat	10-11-31	gold din. 10.00	52.52
"	Rye	10-11-31	" 10.00	49.02
"	Barley	10-11-31	" 10.00	42.01
"	Oats	10-11-31	" 10.00	28.01
"	Maize	10-11-31	" 5.00	24.50
"	Wheat- and rye flour	10-11-31	" 16.00	274.48

Bulgaria : It should be noted that in addition to the custom duties given on p. p. 62 and 63 of the January Bulletin, there are other taxes and duties to the following total amounts : wheat 65.14 paper-levas, rye 59.14 p.-l., barley 49.08 p.-l., oats 56.14 p.-l., maize 54.64 p.-l., wheat flour 104.52 p.-l. (best quality 109.02 p.-l.), rye flour 104.52 p.-l. (12.87 \$c., 10.90 \$c., 7.76 \$c., 5.91 \$c., 10.07 \$c. per bushel respectively ; 67.44 \$c. or 70.35 \$c per barrel).

MONTHLY CROP REPORT AND AGRICULTURAL STATISTICS

The following notes refer to crop conditions quoted in the crop reports and in the tables. — Crop condition according to the system of the country: Germany, Austria, Hungary, Luxemburg and Czechoslovakia: 1 = excellent, 2 = good, 3 = average, 4 = bad, 5 = very bad; France: 100 = excellent, 70 = good, 60 = fairly good, 50 = average, 30 = bad; Lithuania, Poland, Sweden and Switzerland: 5 = excellent, 4 = good, 3 = average, 2 = bad, 1 = very bad; Netherlands: 90 = excellent, 70 = good, 60 = fairly good, 50 = below average; U. S. S. R.: 5 = good, 4 = above the average, 3 = average, 2 = below average, 1 = bad; United States: 100 = crop condition which promises a normal yield. — For other countries the system of the Institute is employed: 100 = crop condition which promises a yield equal to the average of the last ten years.

CERÉALS

Situation of the Wheat Market.

Last month the supply and demand situation of wheat in the current cereal year was passed in review; now that official data for export and import in the half-year 1 August 1930-31 January 1931 are available it is of interest to examine the movement of trade during the first half of the present season and the prospects for the succeeding half. In the following table are brought together data on the quantity exportable in 1930-31 from the surplus-producing countries and that actually exported during the first half-year. The differences between the two series represent the quantity still available for export on 1 February 1931, that is, at the beginning of the second half of the season. Comparable data of the two preceding years are also given.

Exportable Surpluses and Exports of Wheat (including flour in terms of grain).

COUNTRIES	Total export surplus 1 August-31 July			Net exports 1 August-31 January			Export surplus remaining on 1 February		
	1930/31	1929/30	1928/29	1930/31	1929/30	1928/29	1931	1930	1929
	million centals								
Canada	(1) 225	(1) 181	(1) 300	(2) 94	(2) 50	(2) 146	(1) 132	(1) 131	(1) 163
United States	215	216	205	38	52	54	177	164	151
Argentina	110	110	187	17	57	47	93	53	140
Australia	110	60	88	30	16	26	80	44	62
U. S. S. R. . . .	55	4	0	46	4	0	9	0	0
Other countries ⁽²⁾	45	42	33	24	26	20	21	16	13
Totals (rounded)	760	610	820	250	205	290	510	405	530
million bushels									
Canada	(1) 375	(1) 301	(1) 514	(2) 155	(2) 83	(2) 424	(1) 220	(1) 218	(1) 270
United States	355	300	342	64	86	90	291	274	252
Argentina	185	185	312	29	94	78	156	91	234
Australia	185	100	147	50	27	44	135	73	103
U. S. S. R. . . .	95	7	0	77	7	0	18	0	0
Other countries ⁽²⁾	95	60	55	40	44	33	35	25	22
Totals (rounded)	1,270	1,020	1,370	415	344	490	855	680	840

(1) Including amounts in store in United States.

(2) Excluding amounts exported to United States and added to stocks there.

(3) Danubian countries, Poland, Lithuania, Northern Africa, etc., approximate data.

The total export during the first half of the season was, as appears from the table, 250 million centals (415 million bushels). This is distinctly above the corresponding quantity in the previous year, during which, however, the demand from the importing countries was very low owing to the excellent crop obtained by them; it is, on the other hand, rather below that of 1928-29, when the importing countries, had a crop very nearly the same as in the present season. To cover the present total demand of the importing countries, which is calculated at 510 million centals (840 million bushels) an export during the second half of the present season a little above that of the past months would be sufficient, while it may be taken that the total demand on the export markets during the period February-July will probably oscillate about a level slightly higher than that maintained during the first six months.

Amongst the exporting countries Canada has recovered its place as the world's leading supplier of wheat, a place lost to Argentina in the first half of last year owing to the well-known price policy of the Pools. It has succeeded in exporting little less than the half of its surplus and everything leads to the belief that in the next six months Canadian exports will continue to be considerable though they have to face the competition of wheat from the southern hemisphere, which normally reaches its maximum in the second half of each year.

The United States has a net export of 38 million centals (64 million bushels) in the period August-January. It may at first sight seem strange that a country where prices are maintained at a level higher than that of the world market should be able to export such a proportionately large quantity. If, however, the data for separate months are examined it will be seen that the bulk of this quantity, was exported during the earlier months of the half-year 14 millions centals in August, 10 in September, 6 in October (23, 16, and 9 million bushels) — that is, in the months when the price margin between Winnipeg and Chicago was smallest. The decreasing importance of exports, already shown in the August-October quarter was still further accentuated in the succeeding quarter *pari passu* with the increase and stabilisation of the price margin between the internal and international markets. In the three months November-January shipments to foreign countries, mainly of flour, fell to 4 million centals in November, 3 in December and 2 in January (7, 5, and 4 million bushels respectively), thus attaining quite modest dimensions. It is, however, in the United States that there is found the greatest concentration of exportable surplus, estimated on 1 February at about 180 million centals (300 million bushels), equal to over one-third of the world surplus at the same date. While this quantity is very large, the existing supplies in the other exporting countries are more than sufficient to fill the requirements of the importing countries during the second half of the present season without the need for recourse to the United States market. It is therefore probable that the amount that the United States will be called on to place on the world market will be of very modest dimensions, should the price margin between Chicago and the rest of the world remain at its present dimensions.

Argentina has been able during the present half of the season to place almost the whole of the small remaining stocks of wheat from the poor harvest of 1929-30 on the market. This season's harvest has been comparatively large, despite damage at the last moment from bad weather during the period of ripening and harvesting. The necessity of realisation, together, with the lack of adequate storage for the conservation over a long period of large masses of grain, leads to the conclusion that the amounts entering into international trade from this source in the coming months will undergo very considerable augmentation.

Australia also, which finds itself in a position closely analogous to that of Argentina, as regards the magnitude of its supplies and the urgency of placing them on the market, will play an important part in the trade of the latter half of the season.

As for the U. S. S. R., the estimate of exportable surplus is so far purely conjectural and the amount on 1. February as given in the table at 10 million centals (15 million bushels) represents a simple calculation of the difference between that estimate and the actual exports of the first six months. It remains a fact that Russian shipments showed a rising tempo during the period August-November — 4 million centals in August, 5 in September, 11 in October, 17 in November (6, 9, 19 and 28 million bushels respectively) — while in the succeeding months there has been a falling off — 7 million centals in December and 2 in January (11 and 4 million bushels) — and in the last few weeks shipments have remained within narrow limits.

Finally, as regards the minor exporters, notwithstanding the greater opportunities available to them through the proximity of the consuming markets, they have had difficulties in placing their surpluses since the violent decline in prices on the world markets, and, though the quantities remaining in their possession are small in comparison with those of the greater exporting countries they also considerably exceed those of the preceding years at the same date. The rapid disposal of all the stocks existing on 1 February in these countries does not appear easy and, contrary to the usual practice, a certain part will have to be carried over into the next season.

In conclusion, from this examination of the situation, based on the factors so far known but still susceptible to unforeseen modifications, it would be expected that in the period February-July Argentine and Australian exports would increase, those of Canada and the U. S. S. R. become smaller, while those of the United States would be reduced to minimum proportions. The probable carryover into the following season 1931-32, estimated at 250 million centals (430 million bushels) should be concentrated on 1 August for the greater part in the United States, to a less extent in Canada, Argentina and Australia and in small quantities amongst the minor exporters.

As regards importing countries the data for actual imports into the various European countries during the period August-January compared with those for the corresponding period in the two preceding years, are brought together in the following table.

Net imports of wheat (including flour in terms of grain).

COUNTRIES	First half of cereal year (1 August-31 January)					Total cereal year (1 August-31 July)					First half of cereal year (1 August-31 January)					Total cereal year (1 August-31 July)				
	millions of centals					millions of bushels of 60 lb.					millions of centals					millions of bushels of 60 lb.				
	1930-31	1929-30	1928-29	1929-30	1928-29	1930-31	1929-30	1928-29	1929-30	1928-29	1930-31	1929-30	1928-29	1929-30	1928-29	1930-31	1929-30	1928-29	1929-30	1928-29
Germany	9.4	17.4	21.4	28.7	46.7	15.6	29.0	35.6	47.0	77.9	15.6	29.0	35.6	47.0	77.9	15.6	29.0	35.6	47.0	77.9
Austria	3.7	5.2	4.4	11.4	8.4	6.2	8.7	7.3	19.0	14.0	6.2	8.7	7.3	19.0	14.0	6.2	8.7	7.3	19.0	14.0
Belgium	13.2	13.0	12.8	25.4	25.1	22.0	21.7	21.3	42.3	41.9	22.0	21.7	21.3	42.3	41.9	22.0	21.7	21.3	42.3	41.9
Denmark	3.4	2.6	4.4	4.7	9.9	5.6	4.4	7.3	7.8	16.5	5.6	4.4	7.3	7.8	16.5	5.6	4.4	7.3	7.8	16.5
Estonia, Finland, Latvia	2.8	3.2	3.3	5.5	6.4	5.7	5.3	5.5	9.2	10.7	5.7	5.3	5.5	9.2	10.7	5.7	5.3	5.5	9.2	10.7
France	13.0	12.3	14.8 (1)	0.5	32.0	21.6	20.5	24.6 (1)	10.9	53.3	21.6	20.5	24.6 (1)	10.9	53.3	21.6	20.5	24.6 (1)	10.9	53.3
Gr. Britain and Ireland	79.5	73.3	64.4	133.2	131.0	132.5	122.2	107.3	222.0	218.3	132.5	122.2	107.3	222.0	218.3	132.5	122.2	107.3	222.0	218.3
Greece (2)	7.1	6.0	5.7	13.0	13.2	11.8	11.0	9.6	21.7	22.0	11.8	11.0	9.6	21.7	22.0	11.8	11.0	9.6	21.7	22.0
Italy	23.5	5.2	24.0	25.4	52.7	39.1	8.7	40.0	42.3	87.8	39.1	8.7	40.0	42.3	87.8	39.1	8.7	40.0	42.3	87.8
Netherlands	12.2	8.7	9.5	18.1	17.6	20.4	14.6	15.8	30.2	29.4	20.4	14.6	15.8	30.2	29.4	20.4	14.6	15.8	30.2	29.4
Portugal	0.2	0.7 (2)	2.2	3.9 (2)	4.4	0.4	1.2 (2)	3.7	6.6 (2)	7.3	0.4	1.2 (2)	3.7	6.6 (2)	7.3	0.4	1.2 (2)	3.7	6.6 (2)	7.3
Sweden and Norway	4.8	4.6	5.5	8.4	10.1	8.0	7.6	9.2	14.0	16.9	8.0	7.6	9.2	14.0	16.9	8.0	7.6	9.2	14.0	16.9
Switzerland	6.4	5.1	4.9	9.6	9.0	10.6	8.5	8.1	16.0	16.5	10.6	8.5	8.1	16.0	16.5	10.6	8.5	8.1	16.0	16.5
Czechoslovakia	7.7	4.2	6.0	7.9	10.1	12.8	7.0	9.9	13.2	16.9	12.8	7.0	9.9	13.2	16.9	12.8	7.0	9.9	13.2	16.9
• Totals	186.9	162.1	183.3	301.7	377.5	312.3	270.4	305.2	503.1	629.4	312.3	270.4	305.2	503.1	629.4	312.3	270.4	305.2	503.1	629.4
Other Countries (Spain, Malta, Turkey etc.) (2) . . . . .	...	3.3	8.8	6.0	17.6	...	5.5	14.7	11.0	29.4	...	5.5	14.7	11.0	29.4	...	5.5	14.7	11.0	29.4

(1) During the second half season exports exceeded imports. — (2) Figures partly estimated.

Imports in the first half-year show a good development, distinctly exceeding the corresponding figure for last year, which, as is well known, was a year of excellent produc-

tion in Europe, and also slightly exceeding that for 1928-29; when the crop was a little above that of last year. It is estimated that the total European demand will this year attain 410 million centals (680 million bushels) and since in the first half of the season 190 million centals (310 million bushels) of this were imported, the amount necessary in the second half-year should be 220 million centals (370 million bushels). During the next few months there should, however, be a slight increase in the European demand on the international wheat market. Amongst the countries where an intensification of demand may be expected should be included Italy, for which a total import of 55 million centals (90 million bushels) is expected, France, which has had a winter rather unfavourable to crops, and some other countries of minor importance.

As regards extra-European countries, of which the consumption has been estimated at 100 million centals (160 million bushels), imports, calculated indirectly, should be about 50 million centals (80 million bushels) for the period August-January and appear therefore to reach exactly the amount expected.

It need hardly be remarked that the conclusions drawn, especially as regards the probable course of trade, are based on the present grain situation; a situation that may undergo considerable and even radical modifications, especially in relation to the prospects of future crops. The information on the latter so far available is still rather premature, and no conclusions of a fair degree of probability may be drawn from it. Much will depend on the areas devoted to the crop this spring in the northern hemisphere and next summer in the southern hemisphere. In the last number of the bulletin it has already been emphasised that, if in the current year the areas under grain remain at the level of the past year, any considerable reduction in the stocks now depressing the market would be very improbable, except, of course, in the exceptional case of distinctly adverse weather conditions throughout the world.

Data so far available for the area under winter wheat do not differ greatly from those of last year. For the 14 countries for which they are known, representing nearly $\frac{2}{3}$ of the winter wheat area in the northern hemisphere, the total for 1930-31 is 129 million acres against 125 million last season, showing an increase of about 4 million. If the figure of *Ukraine* which is included in this total, is excluded, there is found to be a decrease of only 500,000 acres. It remains to be seen what extension will be made of spring sowings, especially important in *Canada*, the *United States* and the *U. S. S. R.* and later of those in *Argentina* and *Australia*.

The situation of winter crops at the beginning of March was fairly promising in most of the European countries except *France* and *Belgium*, where damage was caused by excessive rain and alternate freezing and thawing, and in the *Iberian peninsula*, which experienced a prolonged drought. The condition of winter wheat sowings also seems to be good in the *United States* and *North Africa*. In *India*, where the harvest is imminent, prospects indicate an average production below that of last year.

G. C.

Austria : Widespread and heavy snow fell towards the end of the first week in February, followed by the coldest weather experienced this winter. At the beginning of the latter half of the month there was further heavy snowfall, especially in *Carinthia* and on the eastern Alpine slopes. In the last week of February the snow slowly began to melt.

As far as could be judged at the beginning of March, the sowings had not been damaged by cold. As the ground was seldom frozen field mice caused some local damage.

The appearance of winter wheat and barley is generally satisfactory ; winter rye sowings have yellowed somewhat, being too dense.

On March 1, the crop condition of winter cereals was : wheat : 2.5 (against 2.4 on February 1 of this year and 2.6 on March 1, 1930) ; rye : 2.4 (2.4, 2.5) and barley : 2.5 (2.4, 2.5).

Belgium : February was characterised by abundant rains alternating with frost and snow. The soil is very wet. On high or well drained soils the condition of winter cereals is satisfactory. Sowings in many areas are being damaged by excessive moisture. Stands of late sown wheat are thin. Oat growing will probably be somewhat extended. Adverse weather has hindered field work ; operations were limited to indoor farm work, transport of manure and threshing of cereals.

Area sown with Winter Cereals.

COUNTRIES	WHEAT			RYE			BARLEY			OATS		
	1930/31	% 1930/31		1930/31	% 1930/31		1930/31	% 1930/31		1930/31	% 1930/31	
		1924- 1925	1928- 1929		1924- 1925	1928- 1929		1924- 1925	1928- 1929		1924- 1925	1928- 1929
		to	to		to	to		to	to			
		= 100	= 100		= 100	= 100		= 100	= 100			
(thousand acres)												
Germany . . .	4,324	106.0	—	10,370	90.4	—	404	101.6	—	—	—	—
Bulgaria . . .	2,908	100.0	110.8	583	95.0	130.9	514	100.0	117.3	—	—	—
Spain . . .	10,872	103.2	—	1,544	103.7	—	4,300	100.0	—	1,603	92.1	—
Finland . . .	82	108.0	128.6	556	100.0	98.5	—	—	—	—	—	—
Italy . . .	11,803	101.1	—	—	—	—	—	—	—	—	—	—
Lithuania . . .	410*	113.3	182.5	1,136	116.6	—	—	—	—	—	—	—
Rumania . . .	6,162	89.7	87.4	802	87.8	123.3	248	76.8	98.5	—	—	—
Ukraine . . .	13,902	142.0	119.4	12,867	93.6	101.1	—	—	—	—	—	—
Canada . . .	804	85.8	94.4	944	81.0	147.8	—	—	—	—	—	—
United States . . .	42,042	98.9	98.6 (2)	1,683	104.1	109.2	—	—	—	—	—	—
British India . . .	31,004	103.8	99.7	—	—	—	—	—	—	—	—	—
Algeria . . .	3,081	78.1	84.3	5	143.2	144.8	3,042	84.5	83.3	544	86.0	89.9
Tripolitania . . .	17	140.0	—	—	—	—	371	150.0	—	—	—	—
Tunis . . .	1,730	100.0	100.6	—	—	—	988	100.0	79.5	99	100.0	94.7

(1) Percentage of the mean for 1924/25 to 1927/28. — (2) Acreage sown for grain allowance being made for average diversion to other uses.

Bulgaria : Crop condition of winter cereals in February was excellent.

Spain : The drought has caused serious damage to the sowings, no rain having fallen since the beginning of March.

Estonia : There is an extraordinarily thick snow cover.

Irish Free State : Spring cultivation was carried out in February under fair conditions over the greater part of the South but was greatly retarded in the North and West by wet and stormy weather. Spring sowings have not been begun. The area under winter cereals is likely to be below average, owing to the inclement winter. No serious injury has, however, been done to growing crops.

Production of cereals in 1930 shows a decrease in each case with respect to 1929 and, save in that of oats, to the preceding quinquennium, as is indicated in the following table.

Cereal Production in the Irish Free State.

		1930	1929	Average 1924-28	Percentages 1929 = 100	Aver. = 100
		—	—	—	—	—
Oats	(1000 cent.)	14,160	15,442	13,491	91.7	105.0
	(1000 bush.)	44,250	48,257	42,158		
Barley	(1000 cent.)	2,648	2,861	2,982	92.6	88.8
	(1000 bush.)	5,517	5,960	6,213		
Wheat	(1000 cent.)	655	710	666	92.3	98.5
	(1000 bush.)	1,092	1,184	1,109		
Rye	(1000 cent.)	66	71	105	93.2	63.0
	(1000 bush.)	118	126	187		

France : In general the weather from 10 February to 10 March was bad, with almost continuous and abundant rain but only rarely snow. Fine days were rare and on the other hand the cold was rendered specially harmful by the wet condition of the soil and frequent freezing and thawing. Crop condition of cereals was rather bad.

In the Paris basin the first sowings and those on light lands are everywhere in good condition. In the Beauce, the great producing region, wheat has a good appearance. In the other regions, on the contrary, on the strong lands and in the case of late sowings, cereals are in bad condition, part rotted, many yellow and thin; in the south-west cereals on the plains are spoilt. Though they have suffered little from moisture, crops in the Rhône valley and in the south-east have experienced damp cold weather in February and alternate freezing and thawing. Weeds and mice have been somewhat widespread. The bad weather has been especially harmful to work in the fields and to the spring sowings, which have been retarded. In February wheat had not yet been sown. The Paris basin and the Beauce in particular have been able to begin sowings in March but in unpropitious conditions. In the other regions it is feared that the sudden retardation of wheat and oats sowings will expose them to the danger of blast. In the south-west preparatory work has been almost impossible. In consequence of the inability to fill the gaps in autumn sowings with spring sowings this year's cereal area will show a considerable reduction. This, aggravated by the mild and rainy weather of the winter which generally, causes poor yields, leads to the expectation of a deficient cereal production.

The area and production of the secondary winter cereals is estimated as follows :

		1930	1929	Average 1924-28	Percentages 1929 = 100	Av. = 100
		—	—	—	—	—
		Area (000 acres)				
Buckwheat	. . . . .	757	803	877	94.2	86.3
Millet	. . . . .	35.2	39.2	40.4	89.8	87.2
		Production (000 centals)				
Buckwheat	. . . . .	8,635	8,178	8,531	105.6	101.2
Millet	. . . . .	251	237	199	106.0	125.9

While the area sown to these crops has been decreasing from year to year, production is fairly well maintained.

Great Britain and Northern Ireland : Variable weather conditions prevailed over most of the country during the greater part of February. Rain was generally frequent while in the north of England, in Wales and in Scotland especially heavy falls of snow occurred. Weather was, however, on the whole comparatively mild for the time of

year. Conditions were unfavourable to cultivation, the land being almost everywhere very wet, and, except for some ploughing in the drier areas, little outdoor work was possible, so that cultivation was almost everywhere save in Scotland hardly as forward as usual. The land worked heavily owing to the absence of severe frosts and very little sowing was possible in England and Wales and practically none in Scotland. In some districts of Northern Ireland sowing of wheat was completed during the month. In Scotland and in Northern Ireland the crop was reported to have been checked in some areas. Crop condition in Scotland was average (100 according to the system of the Institute).

Hungary : The five-week period from January 14 to February 20 was characterised by prevalently mild temperatures and precipitation mostly above the normal in quantity.

Up to February 20 frost damage was very limited.

(Telegram of 10 March) : Weather has been rainy and changeable. Sowings are in vigorous condition. Wheat and rye have at times suffered from frosts.

Italy : Snow fell in the first half of February more or less heavily everywhere, and low temperatures prevailed. Wheat was generally in good condition. In the second half of the month the weather was prevalently rainy and violent storms in the South caused damage in Sicily. In Northern Italy there was heavy snowfall. Wheat was very promising almost everywhere. Spring sowings proceeded regularly.

Latvia : Temperatures in February were considerably below the normal, the sharpest frosts occurring at the beginning of the month. The quantity of precipitation was about normal and the snow cover increased only slightly.

Portugal : The final figures of area and production of wheat in 1930 and 1929, compared with those on the average for the period 1924-28, are as follows : area 1930 : 1,104,000 acres ; 1929 : 1,075,000 ; 1924-28 : 1,064,000 ; percentages : 102.7 and 103.8. The corresponding figures for production are : 8,119,000 centals (13,531,000 bushels) ; 6,489,000 (10,814,000) ; and 6,073,000 (10,121,000) ; percentages : 125.1 and 133.7.

Rumania : In the first half of February sharp frosts occurred frequently in Bessarabia, Moldavia, the eastern part of Muntenia and especially in Dobrudja. Precipitation was fairly frequent but in many districts the snow cover was not thick enough to protect seedlings from the cold.

At the middle of February the weather changed abruptly, with a considerable rise in temperature ; the cold had caused only insignificant damage to the sowings.

During the whole of the latter half of February the weather was generally favourable to the crops. Frost damage to the seedlings arose only in a few Carpathian areas. Soil moisture is abundant everywhere.

Yugoslavia : The variable weather in the first week of February gave way in the following fortnight to mild, sunny conditions throughout almost the whole country, except the west, where snow fell. In the last week of the month changeable conditions again set in, remaining, however, mild. These weather conditions were favourable to the development of winter crops, which throughout the month had a good appearance.

Canada : The area of mixed grains in Canada in 1930 was 1,201,000 acres against 1,119,000 in 1929 and 955,000, the average for 1924-28 ; percentages : 107.4 and 125.8. Production in 1930 was 19,924,000 centals (46,335,000 bushels) against 16,089,000 (37,417,000) in 1929 and 15,815,000 (36,780,000), the average for the preceding five years ; percentages : 123.8 and 126.0.

United States : Weather during the latter half of February was mild and light to moderate rains favoured field work. Preparations for spring planting in the last week of February were well ahead of the average throughout the East, the central valleys

and the Plains States but excessive moisture hindered field work in parts of Texas, Oklahoma and Arkansas. Seeding of spring wheat continued in the southern parts of the belt and oat sowing was general as far north as eastern Kansas.

In the first week of March sowing of spring wheat had begun in the northern section of the Great Plains.

The rains in the latter half of February were sufficient to keep the top soil fairly moist in the main winter wheat sections, and this, in combination with the mild weather, was very favourable to the crop, condition varying from fair to excellent and greening being noted northwards to Iowa. The subsoil was still very dry in the Ohio Valley as well as in some parts of the Lake region and the central Mississippi Valley, but winter wheat showed further improvement in eastern parts of the main belt, with practically no winter injury noted. Progress and condition of wheat on about the 26th of February were good to excellent in the Southwest while the rain and snow fallen recently in Kansas furnished enough moisture to improve prospects for growth. More moisture would have been helpful in the northern Great Plains, the Central Rocky Mountain area and the Pacific Northwest but in Washington growth was far in advance of the season. On about March 4, the crop condition of winter wheat was fairly good and in the following week further improved as a result of wet weather.

Uruguay : Production of wheat in 1930-31 according to a first official estimate, is 4,798,000 centals (7,997,000 bushels) against 7,894,000 (13,157,000) last year and 6,945,000 (11,574,000) the quinquennial mean. Percentages 60.8 and 69.1. Threshing was completed three weeks later than last year. Yields vary greatly, ranging from 4 to 8 centals (6 to 13 bushels) per acre, even within the same district.

Production of oats is 1,230,000 centals (3,844,000 bushels) against 1,241,000 (3,877,000) last year and 824,000 (2,574,000) the quinquennial mean. Percentages 99.1 and 149.3.

India : Climatic conditions at sowing time were not quite favourable for the wheat crop; but the condition of the crop on the whole, was at the time of the first forecast (end of January) reported to be good. During the last three weeks of February high rains fell in the Punjab but more was needed. Condition remained about the same as reported last month. In the United Provinces rainfall in the same period was light to moderate and the condition of crops was satisfactory.

Japan : On March 1, the crop condition of wheat and barley was average.

Palestine : Weather conditions during February have been normal except in the extreme South, where the rainfall has been very poor. The development of cereals in most parts of the country is exceptionally promising. Given favourable seasonable conditions from now on, yields should be high. All *afir* sown cereals (*i. e.* winter cereals sown before the advent of the autumn rains) are very forward, so much so that on the coastal plain barley crops are being cut for green food to save them from lodging. The winter sown cereals are also very promising. In the hill regions normal growth is noted and crops in general, though not so advanced as those on the plains, show every prospect of turning out well. In general the condition of all crops is excellent, except in the extreme South, and Gaza district. Sowing of winter crops is concluded.

Turkey : Stormy weather has continued with violent winds in the Izmir region. Heavy hailstorms caused considerable damage to the crops.

Algeria : Sowings are completed, a significant deficit being apparent. Areas sown to wheat and oats will be the lowest since 1924 if the figures given are complete and relate, as there are grounds for believing, to the total. It should, however, be noted that the difference between the figure given in March and the figure given at the time of har-

vest is often very considerable. Last year it was 220,000 acres for wheat and 100,000 acres for barley. Even assuming a divergence, it would require to be, if the sown areas are to reach those of 1924, at least 500,000 acres and 175,000 acres respectively. In any case this year's sowings exceed those of 1923, 1922 and 1921.

February closed with a week of bad weather, with storms and fresh and abundant falls of snow. Despite these rather unfavourable conditions at the end of February sowings were in vigorous condition, though short; a few cases of chlorosis were reported in fields where the water was stagnant and some losses due to cockchafer larvae. The beginning of March was also marked by rather violent rains and bad weather generally.

Cyrenaica : There has been a deficiency of rains this year; south winds have been frequent. Sowing has been effected in good conditions, but, owing to the scarcity of rain in autumn, germination has not been regular.

Egypt. (Telegram of 4 March) : Crop condition of wheat on 1 March was 100 as on 1 February and on 1 March 1930. That of barley was 99, against 100 on 1 February and on 1 March 1930.

French Morocco : Abundant rains fell and February ended with a period of general bad weather. Moisture is everywhere adequate, in the north and west from precipitation and in the south from the numerous springs and the heavy dew. Germination is generally satisfactory and the appearance of the crops at the end of February was good except in the south and west, where it was rather mediocre.

Tripolitania : Sowings were effected in generally good conditions and germination has been regular. Preparations for spring sowings are proceeding favourably.

Tunis : Rains were fairly plentiful in February in the territory as a whole and brought a lowering of temperature, which slackened and even retarded growth in the inland districts. Wind, which was extremely violent at the end of February, was damaging to the crops.

Crop condition was considered good in the north, mediocre in the centre and south, as compared with the preceding month. In the territory as a whole it was 120 as against 109 for wheat.

MAIZE

In view of the imminent new crop of Argentina, which, as far as may at the present be judged, promises to be very large, and as there still exist fairly heavy quantities of maize from previous production in the various countries of surplus production, it may be useful to reproduce data showing the movement of imports over a series of seasons.

They permit account to be taken of the elasticity of consumption of this product in relation to the greater or smaller abundance of world supplies and the price situation.

For this purpose there are given separately, on the one hand, the data of production and imports of the countries which are also producers and on the other hand, the figures of imports of the countries in which consumption is restricted exclusively to the imported product.

On the whole, consumption in the importing countries during the period under examination fluctuated very widely from a minimum of 245 million centals (437 million bushels) in 1928-29 (corresponding to the poor crop of 1928 in the Danubian countries and of 1929 in Argentina) and a maximum of 342 million centals (610 million bushels) in 1926-27 (corresponding to heavy crops in Argentina and the Danubian countries in 1926). Total imports fluctuated from a minimum of 157 million centals (280 million bushels) in 1925-26 to a maximum of 231 million centals (413 million bushels) in 1926-27.

It is interesting to note that in the group of countries which are also producers, the variations in imports — which naturally depend largely on the greater or smaller

Consumption of maize by commercial seasons in the principal importing countries.

(Thousand centals).

COUNTRIES	1925-26			1926-27			1927-28		
	Home product in the autumn of 1925	Imports 1 Nov. 1925 to 31 Oct. 1926	Production + Imports	Home product in the autumn of 1926	Imports 1 Nov. 1926 to 31 Oct. 1927	Production + Imports	Home product in the autumn of 1927	Imports 1 Nov. 1927 to 31 Oct. 1928	Production + Imports
I. Countries producing and importing maize :									
Italy	61,580	10,983	72,563	66,130	8,148	74,278	48,932	16,228	65,160
France	11,202	13,018	24,220	7,103	17,106	24,209	11,603	13,726	25,329
Spain	15,798	8,391	24,189	9,625	6,543	16,168	14,619	6,978	21,597
Czechoslovakia	6,744	7,381	14,105	5,143	8,922	14,065	5,730	6,821	12,551
Portugal	8,031	836	8,867	6,874	1,797	8,671	8,475	1,574	10,049
Greece	3,810	437	4,247	4,555	703	5,258	2,862	589	3,451
Austria	2,575	3,704	6,279	2,143	4,480	6,623	2,771	3,450	6,221
Poland	1,704	388	2,092	2,046	2,851	4,897	1,971	1,418	3,389
Switzerland	99	3,018	3,117	73	3,276	3,349	96	2,791	2,877
Canada	5,915	5,924	11,839	4,376	9,356	13,732	2,368	7,941	10,329
Japan	2,002	481	2,483	1,662	730	2,392	1,856	747	2,603
Totals, Group I	119,460	54,541	174,001	109,730	63,912	173,642	101,293	62,253	163,556
II. Countries not producing but importing maize :									
Great Britain and N. Ireland	—	35,338	35,338	—	43,198	43,198	—	37,984	37,984
Netherlands	—	20,955	20,955	—	20,954	20,954	—	27,633	27,633
Germany	—	12,386	12,386	—	44,161	44,161	—	31,791	31,791
Belgium	—	12,703	12,703	—	17,198	17,198	—	13,411	13,411
Denmark	—	8,109	8,109	—	17,386	17,386	—	16,034	16,034
Irish Free State	—	7,086	7,086	—	8,486	8,486	—	8,386	8,386
Norway	—	2,414	2,414	—	3,179	3,179	—	2,857	2,857
Sweden	—	2,280	2,280	—	3,437	3,437	—	4,826	4,826
Totals, Group II	—	101,271	101,271	—	166,999	166,999	—	142,922	142,922
GENERAL TOTALS	119,460	155,812	275,272	109,730	239,911	340,641	101,293	205,185	306,478

COUNTRIES	1928-29			1929-30			1930-31		
	Home product in the autumn of 1928	Imports 1 Nov. 1928 to 31 Oct. 1929	Production + Imports	Home product in the autumn of 1929	Imports 1 Nov. 1929 to 31 Oct. 1930	Production + Imports	Home product in the autumn of 1930	Imports 1 Nov. 1930 to 31 Oct. 1931	Production + Imports
I. Countries producing and importing maize.									
Italy	36,394	20,274	56,668	55,788	15,245	71,033	66,082	15,245	81,327
France	6,784	18,415	25,199	11,001	17,909	28,910	12,333	17,909	40,842
Spain	11,793	6,596	18,389	13,885	3,836	17,721	15,302	3,836	21,557
Czechoslovakia	4,908	4,991	9,899	5,104	5,439	10,543	4,559	5,439	10,002
Portugal	8,014	1,016	9,030	8,358	1,440	9,804	...	1,440	11,244
Greece	2,840	602	3,442	3,342	185	3,527	2,694	185	3,812
Austria	2,379	2,527	4,906	2,586	4,301	6,887	2,474	4,301	6,775
Poland	1,874	379	2,253	2,101	368	2,469	...	368	2,837
Switzerland	75	2,557	2,632	88	2,542	2,630	86	2,542	2,628
Canada	2,934	8,073	11,007	2,903	7,568	10,471	2,690	7,568	10,258
Japan	1,590	855	2,445	...	1,486	...	...	1,486	...
Totals, Group I	79,585	66,385	145,970	110,556	59,743	170,299	...	59,743	229,042
II. Countries not producing but importing maize.									
Great Britain and N. Ireland	—	35,889	35,889	—	34,152	34,152	—	34,152	34,152
Netherlands	—	22,002	22,002	—	22,584	22,584	—	22,584	22,584
Germany	—	14,458	14,458	—	16,510	16,510	—	16,510	16,510
Belgium	—	12,013	12,013	—	12,683	12,683	—	12,683	12,683
Denmark	—	3,673	3,673	—	6,252	6,252	—	6,252	6,252
Irish Free State	—	7,937	7,937	—	8,018	8,018	—	8,018	8,018
Norway	—	1,689	1,689	—	2,676	2,676	—	2,676	2,676
Sweden	—	1,687	1,687	—	2,264	2,264	—	2,264	2,264
Totals, Group II	—	99,348	99,348	—	105,139	105,139	—	105,139	105,139
GENERAL TOTALS	79,585	165,733	245,318	110,556	164,882	275,438	...	164,882	334,181

(1) Not including Japan.

Consumption of maize by commercial season in the principal importing countries.

(Thousand bushels of 56 lbs)

COUNTRY	1925-26			1926-27			1927-28		
	Home product in the autumn of 1925	Imports 1 Nov. 1925 to 31 Oct. 1926	Production + imports	Home product in the autumn of 1926	Imports 1 Nov. 1926 to 31 Oct. 1927	Production + imports	Home product in the autumn of 1927	Imports 1 Nov. 1927 to 31 Oct. 1928	Production + imports
<i>I. Countries producing and importing maize.</i>									
Italy	109,964	19,613	129,577	118,090	14,551	132,641	87,378	28,979	116,357
France	20,003	23,247	43,250	12,685	30,546	43,231	20,720	24,511	45,231
Spain	28,211	14,984	43,195	17,188	11,685	28,873	26,105	12,460	38,565
Czechoslovakia	12,043	13,145	25,188	9,185	15,932	25,117	10,232	12,181	22,413
Portugal	14,342	1,492	15,834	12,275	3,209	15,484	15,133	2,811	17,944
Greece	6,803	779	7,582	8,134	1,256	9,390	5,110	1,051	6,161
Austria	4,598	6,014	11,212	3,827	8,000	11,827	4,949	6,161	11,110
Poland	3,043	693	3,736	3,653	5,090	8,743	3,520	2,531	6,051
Switzerland	177	5,390	5,567	130	5,850	5,980	154	4,984	5,138
Canada	10,563	10,578	21,141	7,615	10,708	24,523	4,264	14,181	18,445
Japan	3,575	858	4,433	2,968	1,303	4,271	3,315	1,335	4,650
<i>Total Group I</i>	<i>213,322</i>	<i>97,393</i>	<i>310,715</i>	<i>195,950</i>	<i>114,130</i>	<i>310,080</i>	<i>180,880</i>	<i>111,185</i>	<i>292,065</i>
<i>II. Countries not producing but importing maize.</i>									
Great Britain and N. Ireland	—	63,104	63,104	—	77,139	77,139	—	67,828	67,828
Netherlands	—	37,420	37,420	—	53,490	53,490	—	49,344	49,344
Germany	—	22,117	22,117	—	78,859	78,859	—	56,769	56,769
Belgium	—	22,684	22,684	—	30,711	30,711	—	23,948	23,948
Denmark	—	14,480	14,480	—	31,046	31,046	—	28,633	28,633
Irish Free State	—	12,653	12,653	—	15,153	15,153	—	14,976	14,976
Norway	—	4,311	4,311	—	5,677	5,677	—	5,102	5,102
Sweden	—	4,071	4,071	—	6,138	6,138	—	8,618	8,618
<i>Totals, Group II</i>	<i>—</i>	<i>180,840</i>	<i>180,840</i>	<i>—</i>	<i>298,213</i>	<i>298,213</i>	<i>—</i>	<i>255,218</i>	<i>255,218</i>
GENERAL TOTALS	213,322	278,233	491,555	195,950	412,343	608,293	180,880	366,403	547,283

COUNTRY	1928-29			1929-30			1930-31		
	Home product in the autumn of 1928	Imports 1 Nov. 1928 to 31 Oct. 1929	Production + imports	Home product in the autumn of 1929	Imports 1 Nov. 1929 to 31 Oct. 1930	Production + imports	Home product in the autumn of 1930	Imports 1 Nov. 1930 to 31 Oct. 1931	Production + imports
<i>I. Countries producing and importing maize.</i>									
Italy	64,990	36,203	101,193	99,622	27,223	126,845	118,003	—	—
France	12,114	32,885	44,999	19,645	30,908	50,553	22,023	—	—
Spain	21,058	11,779	32,837	24,794	6,850	31,644	27,326	—	—
Czechoslovakia	8,763	8,913	17,676	9,114	9,712	18,826	8,141	—	—
Portugal	14,310	1,815	16,125	14,925	2,583	17,508	—	—	—
Greece	5,071	1,075	6,146	5,968	331	6,299	4,811	—	—
Austria	4,248	4,512	8,760	4,618	7,681	12,299	4,417	—	—
Poland	3,346	677	4,023	3,752	689	4,441	—	—	—
Switzerland	134	4,567	4,701	157	4,539	4,696	154	—	—
Canada	5,240	14,417	19,657	5,185	13,515	18,700	4,803	—	—
Japan	—	2,838	1,705	—	2,653	2,653	—	—	—
<i>Totals, Group I</i>	<i>142,112</i>	<i>118,148</i>	<i>260,260</i>	<i>117,780</i>	<i>106,684</i>	<i>224,464</i>	<i>—</i>	<i>—</i>	<i>—</i>
<i>II. Countries not producing but importing maize.</i>									
Great Britain and N. Ireland	—	64,088	64,088	—	60,986	60,986	—	—	—
Netherlands	—	39,290	39,290	—	40,329	40,329	—	—	—
Germany	—	25,818	25,818	—	29,463	29,463	—	—	—
Belgium	—	21,452	21,452	—	22,649	22,649	—	—	—
Denmark	—	6,559	6,559	—	11,165	11,165	—	—	—
Irish Free State	—	14,173	14,173	—	14,318	14,318	—	—	—
Norway	—	3,016	3,016	—	4,779	4,779	—	—	—
Sweden	—	3,012	3,012	—	4,043	4,043	—	—	—
<i>Totals, Group II</i>	<i>—</i>	<i>177,408</i>	<i>177,408</i>	<i>—</i>	<i>187,762</i>	<i>187,762</i>	<i>—</i>	<i>—</i>	<i>—</i>
GENERAL TOTALS	142,112	295,556	437,668	117,780	294,446	412,226	—	—	—

(1) Not including Japan.

Net Imports of Maize into the principal importing countries in the first three months (November-January) of the last five commercial years and of the current commercial year (thousands of centals and of bushels of 56 lb.).

COUNTRIES	November-January					Nov.	Dec.	January	Nov.- January
	1925-26	1926-27	1927-28	1928-29	1929-30	1930-31			
(Thousands of centals).									
I. Countries producing and importing maize.									
Italy	2,275	1,742	3,042	7,835	3,915	1,446	1,574	844	3,865
France	4,204	4,367	4,195	6,045	5,121	2,679	1,656	1,532	5,867
Spain	2,683	1,455	1,956	2,258	1,918	108	...	...	...
Czechoslovakia	2,729	1,931	1,975	1,874	1,325	582	869	809	2,258
Portugal	317	287	463	320	282	322	302	106	730
Greece	79	117	84	84	70	2	13	...	...
Austria	1,076	1,120	1,049	761	1,122	320	467	417	1,204
Poland	26	190	348	110	82	46	15	18	79
Switzerland	1,316	578	703	1,023	700	317	340	291	948
Canada	1,775	3,042	2,189	2,407	2,844	688	437	392	1,517
Japan	53	77	119	220	377	82	115	106	302
Total	16,555	14,915	16,123	22,937	17,834	6,592	5,783	4,515	16,770
II. Countries not producing but importing maize.									
Great Britain and Northern Ireland	12,073	10,033	11,402	10,329	9,643	4,665	3,922	5,154	13,741
Netherlands	6,565	7,915	8,274	6,790	6,411	2,612	2,701	3,349	8,752
Germany	1,506	7,136	10,326	3,029	5,020	331	575	880	1,786
Belgium	3,657	4,398	4,050	2,595	3,338	1,105	1,142	1,305	3,552
Denmark	2,357	3,049	5,002	833	1,583	511	681	959	2,132
Irish Free State	1,464	1,508	1,484	2,053	1,748	527	911	657	2,094
Norway	465	608	604	256	472	240	355	212	807
Sweden	386	483	1,195	262	401	452	443	467	1,392
Total	28,475	35,139	42,427	27,047	29,216	10,443	10,820	12,983	34,246
GENERAL TOTAL	45,008	50,045	58,550	49,984	47,050	17,035	16,608	17,498	51,016

(Thousands of bushels of 56 lb.).

<i>I. Countries producing and importing maize.</i>									
Italy	4,063	3,110	5,433	13,992	6,092	2,583	2,811	1,508	6,001
France	7,508	7,799	7,492	10,795	9,145	4,783	2,957	2,736	10,476
Spain	4,791	2,598	3,492	4,031	3,425	193	...	...	...
Czechoslovakia	4,874	3,448	3,527	3,346	2,366	1,039	1,551	1,445	4,031
Portugal	567	512	827	571	504	576	539	189	1,303
Greece	142	209	150	150	142	4	24	...	...
Austria	1,921	2,016	1,874	1,358	2,004	571	835	744	2,150
Poland	47	339	622	197	146	83	28	31	142
Switzerland	2,350	1,031	1,256	1,827	1,374	567	606	520	1,693
Canada	3,169	5,433	3,900	4,290	5,079	1,228	779	701	2,709
Japan	94	138	213	304	673	146	205	189	539
Total	29,526	25,663	28,795	40,960	31,850	11,773	10,335	8,063	29,944
<i>II. Countries not producing but importing maize:</i>									
Great Britain and Northern Ireland	21,558	17,917	20,361	18,444	17,220	8,330	7,004	9,204	24,538
Netherlands	11,724	14,133	14,775	12,125	11,448	4,965	4,984	5,980	15,629
Germany	2,689	12,744	18,440	7,015	10,035	591	1,028	1,571	3,189
Belgium	6,531	7,654	7,232	4,634	5,960	1,372	2,039	2,331	6,342
Denmark	4,208	5,445	8,933	1,488	2,827	913	1,216	1,713	3,842
Irish Free State	2,614	2,693	2,650	3,665	3,122	941	1,626	1,173	3,740
Norway	831	1,087	1,240	457	842	429	634	378	1,441
Sweden	689	862	2,134	468	717	807	791	935	2,433
Totals, Group II	50,844	62,735	75,765	48,294	52,171	18,648	19,322	23,185	61,154
GENERAL TOTALS	80,370	89,368	104,580	89,256	84,021	30,421	29,937	31,248	91,096

(1) Excluding import of Spain. — (2) Excluding imports of Spain and Greece. — (3) Excluding import of Spain in December-January and of Greece in January.

abundance of the home production — are contained between much narrower limits than for the group of countries which exclusively import. In a restricted number of the latter — especially Germany and Denmark — consumption has given particular proof of maximum elasticity. The percentage increase of imports from the year in which they touched the lowest level (1925-26) to that in which they reached the maximum (1926-27) was 17 % for the group of producing and importing countries, 240 % for Germany and Denmark and 30 % for the other importing and non-producing countries.

As regards the current season the data so far available relate only to the three months November-January and are not therefore sufficient to form the basis of any forecast of consumption in the importing countries during the whole season. Usually the imports of the first three months represent a little under 30 %. However, these data may afford some useful indication of the tendency of consumption in the present circumstances of extremely depressed prices.

On the whole imports have been rather high, the highest in the period under consideration, if those of 1927-28 are excepted. A diminution of any considerable magnitude with respect to almost all preceding seasons occurs only in Germany, owing to the adoption there of measures of restriction on imports; on the other hand, the imports of Great Britain, Ireland, the Netherlands, Norway, and Sweden are the largest so far experienced for the first three months.

V. De.

Surinam : The season has been very favourable for maize and production in the first part of 1931 is expected to be good.

Kenya : A fresh estimate raises production in 1930 to 3,569,000 centals (6,374,000 bushels) against 3,717,000 (6,638,000) in 1929 and 2,089,000 (3,730,000) the five year mean. Percentages 96.0 and 170.9.

Union of South Africa (Telegram of 18 March). : The crop has made remarkable progress though it is very late. Production is estimated at 34,302,000 centals (61,254,000 bushels) against 45,014,000 (80,383,000) in 1929-30, a decrease of 23.8 %, and 36,540,000 (65,250,000) on the average of the five years ending 1928-29, a decrease of 6.1 %.

RICE

Formosa. (Telegram of 16 March) : According to the most recent estimate production of rough rice in 1930-31 is 29,385,000 centals (65,208,000 bushels) against 25,838,000 (57,410,000) in 1929-30 and 25,857,000 (57,458,000) in the preceding quinquennium. Percentages 113.7 and 113.6.

India : At the middle of February in Bengal the cultivation of land for autumn paddy and the transplantation of summer paddy seedlings were making progress. In the third week of the month general rains were helpful and prospects were satisfactory. In Bihar and Orissa rainfall was light to moderate in the first two weeks of February in many areas and was general in the third week.

The final estimate of the area under rice in 1930-31 in India is 81,986,000 acres compared with 80,479,000 in 1929-30 and 80,982,000, the average of the preceding five seasons ; percentages : 101.9 and 101.2. Corresponding figures for production of rough rice are : 1930-31 : 1,089,870 centals (2,421,886,000 bushels) against 1,073,899,000 (2,386,394,000) and 1,053,994,000 (2,342,163,000) respectively : percentages : 101.5 and 103.4.

Surinam : Although yields in 1930 were everywhere below those of 1929, total rice production was larger due to the larger area. Much of the crop was of good quality.

POTATOES

Belgium : Some extension is anticipated in the area to be planted with potatoes.

Irish Free State : Production in 1930 was 52,359,000 centals (87,265,000 bushels), 32.3 % less than in 1929 and 14 % above the five-year mean.

France : Owing to the persistent bad weather and the great difficulty experienced in working the land crops are expected to be very considerably behind.

Italy : Sowings of early varieties has been begun. Increase in area is reported from some provinces.

United States : In the last week of February potato planting was general in southern areas and had advanced as far north as eastern Virginia.

Palestine : In the Ramleh area the crop is developing well.

SUGAR

The international negotiations at Amsterdam, Brussels and Berlin initiated at the invitation of Cuba have led to an entente between certain important countries of production. At the Amsterdam conference the principle of limitation of production was established and at Brussels and Berlin the respective export quotas were fixed.

In contrast to the preceding attempts on various occasions during the recent years of crisis, an agreement has been reached, this being rendered inevitable by the continued growth of production and of stocks in almost all producing countries, not compensated by any growth of consumption but, on the contrary, aggravated by decrease in the latter, with the result on the whole of an exceptional decline in prices.

Accordingly, while the area under beet for the European countries this year is still unknown it may be confidently predicted that it will show a diminution, perhaps a considerable one.

It may be taken as certain that there will be a diminution in the European countries that have adhered to the agreement, namely Germany, Belgium, Hungary, Poland and Czechoslovakia. Amongst the non-adherent countries there will probably be a reduction in France, Great Britain, Sweden, Yugoslavia, Bulgaria and Rumania. In Italy a 5 % reduction has already been fixed. For Denmark there is still some uncertainty and for Austria it appears that there will be an increase to cover internal needs.

For the United States a marked reduction is expected.

As regards the decrease in European beet area there is, however, a reservation to be made, in that the intentions of the U. S. S. R. are not yet definitely known. Indeed, if the U. S. S. R. this year follows the lines of the Five Year Plan, the increase in that area may not only balance the decrease in other European countries but even bring about an increase in the total.

As regards production of beet-sugar in 1930-31 new data are published for Korea, Japan and Australia, telegraphed by the respective governments.

For Korea and Japan there is an increase with respect to last year, and for Australia a decrease.

As regards cane-sugar there is nothing of importance to be noted save the figure as stabilised by law in Cuba.

Production of Cane Sugar.

COUNTRY	1930-31 (1)	1929-30	Average 1924-25 to 1928-29	1930-31 (1)	1929-30	Average 1924-25 to 1928-29	Percentages for 1930-31	
	Thousand centals			Short tons			1929-30 = 100	Average = 100
AMERICA.								
Argentina	8,416	7,506	8,406	420,780	375,810	420,300	112.0	100.0
Brazil	11,464	13,217	16,786	573,196	660,829	839,310	87.0	68.0
Cuba	69,833	104,630	100,750	3,496,640	5,231,437	5,337,420	67.0	65.0
Ecuador	430	420	421	21,500	21,008	21,560	102.0	100.0
United States (Louisiana)	4,157	3,992	1,011	207,850	199,600	95,575	104.0	217.0
Jamaica	1,889	1,449	1,242	90,000	72,460	82,103	96.0	112.0
Mexico	5,401	4,713	4,111	270,000	235,700	205,530	115.0	131.0
Peru	9,259	9,308	7,518	460,000	465,405	375,010	90.0	127.0
Porto Rico	10,424	17,322	12,907	821,210	866,100	645,330	96.0	121.0
Dominican Republic	8,157	8,070	7,580	410,000	403,490	370,000	101.0	108.0
<i>Total, America</i>	<i>135,030</i>	<i>170,627</i>	<i>167,642</i>	<i>6,750,176</i>	<i>8,531,348</i>	<i>8,382,038</i>	<i>79.0</i>	<i>81.0</i>
ASIA.								
Formosa	17,596	17,868	12,169	875,263	893,396	608,450	98.0	144.0
India	71,187	61,816	65,901	3,559,400	3,092,300	3,295,000	115.0	97.0
Japan	2,641	2,818	2,198	132,100	115,609	109,920	114.0	120.0
Java	65,455	64,898	51,086	3,272,681	3,241,864	2,554,268	101.0	128.0
Philippine Is.	17,117	17,858	15,687	870,000	890,000	779,000	98.0	112.0
<i>Total, Asia</i>	<i>174,206</i>	<i>164,728</i>	<i>146,941</i>	<i>8,769,444</i>	<i>8,233,469</i>	<i>7,346,638</i>	<i>106.0</i>	<i>119.0</i>
AFRICA.								
Egypt	2,370	2,308	2,019	118,500	118,402	101,000	100.0	117.0
Mauritius	4,841	5,248	4,982	242,065	262,386	249,100	92.0	97.0
Reunion	1,102	1,117	1,122	60,000	55,854	56,100	99.0	98.0
Union of S. Africa	7,803	5,773	4,748	360,136	288,635	237,390	135.0	164.0
<i>Total, Africa</i>	<i>16,116</i>	<i>14,506</i>	<i>12,871</i>	<i>810,701</i>	<i>725,277</i>	<i>643,590</i>	<i>111.0</i>	<i>125.0</i>
OCEANIA.								
Australia	11,813	11,883	10,843	591,000	594,000	542,000	99.0	109.0
Hawaii	18,298	18,320	16,746	910,000	916,000	837,300	100.0	109.0
Fiji Is.	1,984	1,971	1,895	98,200	98,500	94,730	101.0	105.0
<i>Total, Oceania</i>	<i>32,095</i>	<i>32,174</i>	<i>29,484</i>	<i>1,600,200</i>	<i>1,608,500</i>	<i>1,474,030</i>	<i>100.0</i>	<i>109.0</i>
<i>General Totals</i>	<i>351,441</i>	<i>382,635</i>	<i>356,938</i>	<i>17,810,521</i>	<i>19,698,594</i>	<i>17,846,296</i>	<i>94.0</i>	<i>100.0</i>

(1) Approximate data.

Belgium : A reduction in area sown is expected. Growers are, however, in a state of perplexity and hesitancy regarding the amount of the reduction.

Irish Free State : Production of sugar-beet for 1930-31 is 3,545,000 centals (177,000 short tons) against 3,162,000 (158,000) last season and 2,690,000 (135,000) the five-year average, the percentage increase being thus 12.1 and 31.8 respectively.

France : Owing to the persistent bad weather and the great difficulty experienced in working the land crops are expected to be very considerably behind.

Italy : Area tends to decrease in some provinces.

India : According to a report dated February 19 received from the Government of India, the condition of sugar-cane was, on the whole, good. In the third week of February sugar-cane in Bihar and Orissa was in good condition.

Egypt. (Telegram of 4 March) : Crop condition on 1 March was 102 as on 1 February last, against 101 on 1 March 1930.

Surinam : In the most important producing area of sugar-cane, the product was damaged by drought. In another important area yield was satisfactory and the new crops had a good appearance.

Italian Somalia : The 1930-31 cane area is estimated at 1,550 acres, against 1,600 in 1929-30 and 1,000, on the average for the quadrennium 1925-26 to 1928-29; percentages : 96.9 and 152.8. Production of cane was 827,000 centals (41,300 sh. tons) against 683,000 (34,100) and 481,000 (24,100) respectively; percentage increases : 21.1 and 71.7.

Australia (Telegram of 9 March) : Conditions are favourable except in the southern area, where cool weather has retarded growth.

Production of Beet Sugar (raw).

COUNTRIES	Production 1 September-28 February				Total production during the season						% 1930-31	
	1930-31	1929-30	1930-31	1929-30	1930-31 (1)	1929-30	Average 1924-25 to 1928-29	1930-31 (1)	1929-30	Average 1924-25 to 1928-29	1929-30 = 100	Average = 100
	thousand centals				thousand centals			short tons				
Germany	(2) 54,997	(2) 42,813	(2) 2,749,792	(2) 2,140,622	55,311	43,754	36,885	2,765,495	2,187,694	1,844,219	128.0	150.0
Austria	3,312	2,664	165,588	132,605	3,312	2,654	1,986	165,588	132,605	96,307	125.0	167.0
Belgium	(2) 6,086	(2) 5,455	(2) 304,313	(2) 272,761	6,086	5,469	6,596	304,313	273,426	329,791	111.0	92.0
Bulgaria	—	—	—	—	1,084	816	617	54,200	40,800	30,896	133.0	176.0
Denmark	—	—	—	—	3,682	2,954	3,337	184,000	147,708	166,840	125.0	110.0
Spain	—	—	—	—	6,125	4,880	4,955	306,280	244,017	247,731	125.0	124.0
Irish Free State	468	510	23,390	25,485	468	510	411	23,390	25,485	20,563	92.0	114.0
Finland	—	—	—	—	82	56	60	4,079	2,790	3,017	146.0	135.0
France	—	—	—	—	26,169	19,786	17,667	1,308,455	989,275	883,345	132.0	148.0
Great Britain	10,231	7,039	511,552	351,932	10,231	7,039	2,923	511,552	351,932	146,158	145.0	350.0
Hungary	(2) 5,154	(2) 5,434	(2) 257,707	(2) 271,711	5,154	5,442	4,189	257,708	272,083	209,472	96.0	123.0
Italy	—	—	—	—	9,084	9,597	6,927	454,203	479,846	346,353	96.0	131.0
Latvia	—	—	—	—	265	187 (s)	44	13,228	9,348 (s)	2,205	141.0	600.0
Netherlands	(2) 6,344	(2) 5,663	(2) 317,189	(2) 283,107	6,393	5,723	6,477	380,000	286,170	323,827	112.0	99.0
Poland	—	—	—	—	16,755	20,192	12,029	838,000	1,009,597	651,433	83.0	129.0
Rumania	—	—	—	—	3,307	1,813	2,778	165,345	90,642	138,875	182.0	119.0
Sweden	—	—	—	—	3,748	2,678	2,940	187,391	133,884	146,984	140.0	127.0
Switzerland	—	—	—	—	90	99	151	5,000	4,940	7,572	100.0	65.0
Czechoslovakia	24,918	22,516	1,245,899	1,125,774	24,937	22,822	27,747	1,246,831	1,141,075	1,387,334	109.0	90.0
Turkey	—	—	—	—	214	121 (s)	76	10,700	6,046 (s)	3,780	177.0	283.0
Yugoslavia	—	—	—	—	2,205	2,686	2,007	100,000	134,289	100,369	82.0	110.0
<i>Europe, totals . . . a</i>	—	—	—	—	184,711	159,278	141,802	9,225,736	7,963,752	7,090,011	116.0	130.0
U. S. S. R.	—	—	—	—	39,022	18,387	22,064	1,951,000	919,318	1,103,202	212.0	177.0
<i>Europe, totals . . . b</i>	—	—	—	—	223,733	177,665	163,866	11,176,736	8,883,070	8,193,213	126.0	137.0
Canada	—	—	—	—	948	789	806	47,399	39,431	40,295	120.0	118.0
United States	—	—	—	—	26,932	23,136	22,973	1,346,500	1,157,000	1,148,025	116.0	117.0
<i>Totals, North America</i>	—	—	—	—	27,880	23,925	23,779	1,393,899	1,196,431	1,188,320	117.0	117.0
Korea	—	—	—	—	22	16	11	1,107	818	564	136.0	196.0
Japan	—	—	—	—	617	631	392	32,334	31,544	19,615	102.0	165.0
<i>Asia, totals</i>	—	—	—	—	669	647	403	33,441	32,357	20,179	103.0	166.0
Australia	—	—	—	—	75	78	49	3,752	3,889	2,450	98.0	153.0
<i>General totals . . . a</i>	—	—	—	—	213,335	183,926	166,433	10,636,828	9,196,429	8,391,569	116.0	128.0
<i>General totals . . . b</i>	—	—	—	—	233,357	202,315	193,697	12,607,828	10,115,747	9,404,771	125.0	134.0

a) Not including U.S.S.R. - b) Including U.S.S.R. - (1) Approximate data. - (2) Production at the end of January. - (3) Average 1926-27 to 1928-29.

VINES

Austria : On 1 March crop condition was 2.3 against 2.1 on 1 February 1931 and 2.3 on 1 March 1930.

France : Up to the end of January work in the vineyards of the Midi was favoured by dry and relatively mild weather. February was less favourable, characterised as it was by damp cold and alternate freezing and thawing. In the rest of France, and particularly in the southwest the almost continuous rains and the resulting humidity of the soil made work very difficult; the vineyards have in many cases been invaded by weeds and work is backward.

On the markets quietness continues.

Taxable consumption remains at a fairly high level but so do stocks; on the other

hand, as the season advances, the amount of wine of poor quality and strength increases, so that, while good wines maintain their price, prices of lower quality wines are weakening. The volume of business is small.

Italy : In February pruning and hoeing were carried out regularly

Canada : Production of grapes in 1930 is estimated at 511,000 centals compared with 504,000 in 1929 and 352,000, the average for 1924-28 ; percentages 101.3 and 144.9.

Algeria : The bad weather and the cold retarded work in the vineyards of the Mitidja, and hoeing of the roots was not completed everywhere and in some districts will prove impossible. In Oran work proceeded normally. In the eastern districts the excessive humidity rendered the work difficult and some vineyards were submerged.

OLIVES

From the data given in Table I it may be noticed that compared with preceding years the total production of olive oil in 1930-31 for the countries indicated, which ordinarily account for about 95 % of world production, is extremely low ; it represents hardly 65 % of the average production of the period 1921-22 to 1925-26, which may be considered to be normal.

TABLE I. — *Production of olive oil in thousand centals and American gallons.*

COUNTRIES	1930-31	1929-30	1928-29	1927-28	1926-27	Average 1921-22 to 1925-26
Spain (cent.) . .	2,701	14,553	4,220	14,674	5,073	6,733
(Amer. gal.) . .	36,076	191,231	55,440	192,825	66,660	88,475
Greece (cent.) . . (1)	1,872	1,634	2,207	1,596	1,354	1,532
(Amer. gal.) . (1)	24,596	21,467	28,999	20,974	17,788	20,134
Italy (cent.) . .	3,411	6,446	4,921	3,285	3,890	4,054
(Amer. gal.) .	44,817	84,708	64,061	43,165	50,727	53,276
Portugal (cent.) . .	...	1,290	560	1,956	348	765
(Amer. gal.) .	...	16,947	7,474	25,606	4,577	10,053
Yugoslavia (cent.) . .	...	223	110	73	97	71
(Amer. gal.) .	...	2,926	1,564	956	1,275	927
Algeria (cent.) . .	254	505	404	553	317	600
(Amer. gal.) .	3,332	6,634	6,489	7,271	4,172	7,880
French Morocco (cent.) . .	198	(165)	165	201	44	108
(Amer. gal.) .	2,607	(2,173)	2,173	2,636	579	2,202
Tunis (cent.) . .	397	1,433	992	353	882	573
(Amer. gal.) .	5,215	18,831	13,036	4,635	11,588	7,532
Totals (cent.) . .	...	26,240	13,687	22,691	11,975	14,996
(Amer. gal.) .	...	344,917	179,845	298,158	157,366	190,470

(1) Excluding the data for certain localities.

For some countries, the more recent data of production are still subject to revision ; on the whole, it is not believed, however, that very large changes may be made. For Italy, as the official figure has not yet been published, production of oil has been calculated on the basis of the production of olives which amounted to 18,9 million centals ; supposing a yield of 18.00 % in the absence of untoward factors this percentage seems to be fairly probable, if it is considered that in the quadrennium 1926-27 to 1929-30 the yields of oil were 13.95, 14.80, 15.80 and 17.00 % respectively.

Production was generally poor in all the principal countries, and particularly so in Spain where the trees, attacked by fly, subjected to a prolonged drought and probably exhausted by the exceptional crops of 1927-28 and 1929-30, yielded only 15.0 million centals of olives, against 41.4 on the average for the quinquennium 1924-25 to 1928-29. In Italy also, during the fruit ripening period, fly caused very widespread damage, aggravated by drought and dropping of fruit.

In recent years trade in olive oil, both edible and for industrial purposes, developed notably because the large producing countries, preoccupied by the rapid increase of stocks, have actively attempted to extend their foreign sales. In Table II are grouped the figures of net exports of oil for the six more important exporting countries to illustrate the movement of their foreign trade in the last quinquennium compared with 1921-25.

TABLE II. — *Net Exports of olive oil in thousand centals and American gallons.*

COUNTRIES		1930	1929	1928	1927	1926	Average 1921-25
Spain	(cent.) (1)	2,200	1,133	2,632	1,224	2,132	1,096
	(Amer. gal.) (1)	28,912	14,891	34,500	16,078	28,014	14,398
Greece	(cent.)	159	269	168	179	66	293
	(Amer. gal.)	2,086	3,534	2,202	2,347	869	3,853
Italy	(cent.)	305	789	262	754	489	642
	(Amer. gal.)	4,014	10,371	3,447	9,908	6,431	8,430
Algeria	(cent.)	540	284	481	130	271	203
	(Amer. gal.)	7,008	3,737	6,315	1,709	3,563	2,665
French Morocco,	(cent.) (2)	64	101	0	0	35	11
	(Amer. gal.) (2)	840	1,333	0	0	464	145
Tunis	(cent.) (3)	827	959	284	538	445	357
	(Amer. gal.) (3)	10,864	12,602	3,737	7,069	5,852	4,698
Totals	(cent.) . . . . .	...	3,498	3,928	2,825	3,438	2,602
	(Amer. gal.) . . . . .	...	45,975	51,624	37,111	45,193	34,184

(1) First 11 months. — (2) In the first 9 months only 26 centals (348 Amer. gals.) were exported. — (3) First 9 months.

The olive has a marked capacity of yielding crops varying from year to year; a typical example is afforded by Spain which in the seasons 1929-30 and 1930-31 had a maximum followed by a minimum production with a difference of over 80 %. Consumption on the contrary, either in the producing countries or in the importing countries, for obvious reasons does not tend to fluctuate widely. This explains why trade does not correspond more or less closely to exceptionally high production and, in fact, the figures given in Table III also indicate, in the last quinquennium for the countries mentioned which represent the largest importers, a general and considerable increase not sufficiently in proportion however, to world supplies.

TABLE III. — *Net Imports of olive oil in thousand centals and American gallons.*

COUNTRIES		1930	1929	1928	1927	1926	Average 1921-25
France	(cent.)	509	351	247	112	384	357
	(Amer. gal.)	6,692	4,606	3,245	1,477	5,041	4,693
Great Britain	(cent.)	209	203	205	185	176	161
	(Amer. gal.)	2,752	2,665	2,694	2,433	2,318	2,115
Norway	(cent.)	60	104	71	77	62	49
	(Amer. gal.)	782	1,362	927	927	811	637
Switzerland	(cent.)	154	132	126	101	97	64
	(Amer. gal.)	2,028	1,736	1,651	1,333	1,275	840
Cuba	(cent.) . . . . .	...	168	190	130	174	143
	(Amer. gal.) . . . . .	...	2,202	2,491	1,709	2,289	1,883
United States	(cent.)	1,629	1,530	1,312	1,241	1,285	1,052
	(Amer. gal.)	21,409	20,105	17,237	16,310	16,890	13,819
Argentina	(cent.)	1,323	1,122	1,164	772	913	564
	(Amer. gal.)	17,382	14,746	15,296	10,140	11,904	7,416
Brazil	(cent.) . . . . .	...	90	201	97	112	68
	(Amer. gal.) . . . . .	...	1,304	2,636	1,275	1,477	898
Chile	(cent.) . . . . .	...	254	267	121	146	77
	(Amer. gal.) . . . . .	...	3,332	3,505	1,563	1,912	1,014
Uruguay	(cent.) . . . . .	...	139	165	104	137	88
	(Amer. gal.) . . . . .	...	1,825	2,173	1,362	1,796	1,159
Totals	(cent.) . . . . .	...	4,102	3,948	2,934	3,466	2,623
	(Amer. gal.) . . . . .	...	53,885	51,855	38,559	45,803	34,474

Among the importing countries which show considerable absorptive capacity are to be noted the United States, especially for oil for industrial purposes, and Argentina for edible oil. Norway, which until 1929 considerably increased its purchases of oil, especially Spanish, in 1930 sharply reduced its volume of imports while in Switzerland which is a market, however, of mediocre importance, imports are in constant increase.

Olive oil prices in the principal producing countries specified in Table IV reflect the influence, especially in the first half of 1930, of the considerable stocks remaining on the market and the results of the general crisis of agricultural products.

TABLE IV. — *Olive oil prices in the principal producing countries.*

Period	Spain		Italy	Portugal	Greece	Tunis	
	Andalusia ordinary (Barcel- lona)	Tortosa fine	(for wholesale)	(for wholesale)		1st pressing	2nd pressing
	pesetas per quint.	pesetas per quint.	lire per quint.	scudi per hl.		frs. per quint.	frs. per quint.
<i>Average 1927</i>	271	262	934	828	3,225	1,109	1,012
" <i>1928</i>	209	217	757	623	3,065	904	851
" <i>1929</i>	224	221	604	752	2,699	707	674
January 1930	187	170	429	554	2,004	461	424
February "	183	170	449	550	1,931	457	420
March "	178	160	482	547	1,764	408	427
April "	165	160	470	535	1,662	445	415
May "	161	159	459	525	1,723	444	399
June "	157	140	450	514	1,741	438	392
July "	165	160	461	529	1,920	517	462
August "	190	205	540	596	2,127	625	570
September "	204	205	565	609	2,110	620	562
October "	206	205	579	564	...	600	552
November "	202	220	569	568	...	583	545
December "	200	220	556	616	...	577	540
<i>Average 1930</i>	183	181	501	559	...	519	476

In the summer of 1930, probably under the influence of preliminary information on the season 1930-31, quotations showed a general and considerable rise which was, on the whole, maintained to a greater or smaller extent in the last months of the year : the average for 1930 however, for all the markets considered is much below the averages for 1927, 1928 and 1929.

Although it is difficult to forecast in this field, yet, bearing in mind on the one hand the probability of a relaxation of the world crisis and on the other hand, the low level of world oil production relative to the season 1930-31, it may be logical to anticipate a recovery in quotations during 1931.

From information received at the Institute on the season 1931-32 it is noted that seasonal work for olives has generally been effected under good conditions ; cultivation, manuring and pruning have progressed regularly. Crop condition at present is on the whole good.

M. C.

France : Production of table olives in 1930-31 is estimated at 904,000 centals against 1,075,000 in 1929-30 and 842,000, the average for the preceding five seasons ; percentages : 84.0 and 107.4. In 1924 the area of olives was estimated at 297,000 acres ; no other estimate has since been made.

Italy : Cultivation was carried out normally in February.

COTTON

The cotton season 1929-30.

Countries, both large and small producers of cotton, for which statistical data are possessed to-day number about 80 while in 1923 the number was 63 and in 1918 about 36. This development is due only partly to the improvement of statistical services, as in many countries cotton growing is comparatively recent, having been introduced under the stimulus of intense demand and consequently very high prices during the war and at some phases of the post-war period; and also under the influence of present economic protection. At all events, it would appear that this expansion of cotton growing justifies the opinion that cotton consumption is potentially unlimited, only considering the fact that there exist millions of people who still do not use it, and that therefore the production of this textile fibre may still increase as the soil more or less suited to the cotton crop between 40° Lat. N. and 40° Lat. S. has not yet been completely exploited.

It is true that the rather low yields obtained at present cast some doubt on this latter assertion, showing that corresponding to a relatively large increase in area there has taken place a much smaller increase of production; because on the new marginal soils having a growing cost of production unitary yields have declined. Moreover cotton, if it is to be a profitable crop, requires extensive irrigation works, a technical-administrative organisation, a large amount of mostly skilled labour, suitable scientific equipment to combat plant diseases, for the selection of the best varieties, for the application of a whole series of operations necessary to the sterilizing, selection, distribution and sale of seeds, to exercise due control to prevent the hybridization of the different varieties, the degeneration of the better breeds and force cultivation with consequent decline of yields and deterioration of good qualities in the fibre, etc. Besides the above, provision must be made for adequate means of transport, industrial organisation for ginning, pressing and baling of the cotton as well as its shipping and the organisation and control of home markets and export.

The result of all this is that the marginal cost of cultivation of cotton is almost prohibitive unless cotton prices remain very high. It seems, therefore, somewhat improbable that a further expansion of cotton growing will take place during the next few years unless unforeseen conditions arise. Judging, on the contrary, from present prices and the situation on the world money market, there is every indication that in the near future there will occur a contraction of areas cultivated and perhaps also the abandonment of cotton growing in those countries not equipped for production at decreasing costs; unless protective or other measures are taken to retain cultivation where otherwise it could not economically exist.

Statistical data for last season show that world production, which has already been nearly completely estimated, was about 126 million centals (26 million bales). Compared with the average of the five seasons immediately preceding the war, the increase amounts to 20 million centals (4 million bales) or 18%. For the same period world population has increased by about 10 % and both wool and natural and artificial silk have continued to furnish constantly increasing supplies of raw material for spinning. It is therefore obvious that world supplies of textile materials are to-day larger than before the war. Further, if the production of last season is compared with those obtained in the post-war period it does not appear to be exceptionally large and compared with the record production of 1926-27 it is found to be smaller by more than 9 million centals (2 million bales), a figure exceeding that of the record crop of Egypt in 1929-30.

Examining more in detail the statistics for 1929-30, it is seen that the area has increased by 29 % compared with the pre-war average, having passed from 66.2 million

acres to 85.5 million. In the same period, the area in the United States increased by 34 %, in India by 12 % and in Egypt by 10 % ; or for the three countries a combined increase of 25 %. In the U. S. S. R. the increase was 63 % and in minor producing countries taken together, 60 %.

Equating the total pre-war average area and that of 1929-30 to 100, the following percentage relations are obtained :

Percentage relation to the general total area.

	Average 1909/10-1913/14	Season 1929/30
United States	51.6	53.6
India	34.0	29.5
Egypt	2.6	2.2
<i>Total</i>	<i>88.2</i>	<i>85.3</i>
U. S. S. R.	2.4	3.0
Other countries	9.4	11.7
<i>General total</i>	<i>100.0</i>	<i>100.0</i>

The area cultivated with cotton in the United States was therefore, last season, equivalent to 53.6 % of the total world cotton area against 51.6 on the average for the pre-war period. India has passed from 34.0 to 29.5 and Egypt from 2.6 to 2.2. The three countries combined show a decrease from 88.2 to 85.3. The U. S. S. R. and the other countries therefore show a change from 11.8 to 14.7 % of the world total.

Turning to production, there has already been stated to be an increase of 18 % compared with the pre-war average. As in the case of area, all countries show an increase : the United States : 14 % ; India 16 % ; Egypt : 19 % ; the three countries together : 15 % ; the U. S. S. R. : 45 % ; other countries : 32 % (an absolute figure of 4.9 million centals or 1 million bales). Comparing these increases with those of area and taking into account the fact that weather conditions last season were on the whole unfavourable to production, an index is obtained of the decline in yields in those countries where the area has been excessively extended on unsuitable soils :

Percentage increase in the season 1929-30 compared with the average of 1909-10 to 1913-14.

	Area	Production
United States	34	14
India	12	16
Egypt	10	19
<i>Percentage increase for the three countries</i>	<i>25</i>	<i>15</i>
U. S. S. R.	63	45
Other countries	60	32
<i>Percentage increase for the world total</i>	<i>31</i>	<i>18</i>

In fact the average unitary yield in the United States has decreased from 1.8 centals (0.4 bales) to 1.5 centals (0.3 bales) of lint per acre, while in India it has remained almost unchanged and in Egypt has passed from 4.0 centals (0.8 bales) to 4.3 centals (0.9 bales). For the U. S. S. R. there is a fall from 2.8 (0.6) to 2.4 (0.5).

Equating the total average pre-war production and that of the season 1929-30 to 100, the following percentage relations are obtained :

Percentage relation to the general total production.

	Average 1909/10 to 1913/14	Season 1929/30
United States	58.9	56.7
India	16.2	15.9
Egypt	6.6	6.6
<i>Total</i>	<i>81.7</i>	<i>79.2</i>
U. S. S. R.	4.1	5.0
Other countries	14.2	15.8
<i>General total</i>	<i>100.0</i>	<i>100.0</i>

The United States in 1929-30 contributed 56.7 % to the world production against 58.9 on the average for the five seasons immediately preceding the war; India 15.9 against 16.2. For Egypt the pre-war percentage of 6.6 remained unchanged. The three countries together furnished 79.2 % of world production against 81.7 %. The U. S. S. R. produced 5.0 % against 4.1 %. The other countries combined, 15.8 % against 14.2 %.

Below are given the figures (in thousand centals and bales) of production in the last three seasons :

	1927/28		1928/29		1929/30	
	centals	bales	centals	bales	centals	bales
United States	61,926	12,955	69,206	14,478	70,879	14,828
India	23,852	4,990	23,243	4,863	19,833	4,149
Egypt	6,030	1,261	7,992	1,672	8,250	1,726
<i>Total</i>	<i>91,808</i>	<i>19,206</i>	<i>100,441</i>	<i>21,013</i>	<i>98,962</i>	<i>20,703</i>
U. S. S. R.	5,218	1,092	5,964	1,248	6,257	1,309
Other countries	16,579	3,468	17,805	3,725	19,784	4,139
<i>General totals</i>	<i>113,605</i>	<i>23,766</i>	<i>124,210</i>	<i>25,986</i>	<i>125,003</i>	<i>26,151</i>

The season 1926-27 yielded about 134 million centals or 28 million bales (113.5 million centals or 23.8 million bales for the three large producers combined).

Favourable consideration was then given to the intervention of public bodies to reduce crops grown. In the following season the area was effectively reduced (in the United States by 15 %) and production fell to 113.5 million centals (23.8 million bales) and 91.8 million centals (19.2 million bales) respectively. Production in 1928-29 however, again rose (the area in the United States exceeded that of 1927-28 by 13 %) reaching 124.2 million centals (26.0 million bales) and 100.4 million centals (21.0 million bales) respectively. At the same time there occurred the financial crisis at the end of 1929, accompanied by the intervention of public and State authorized bodies both in the United States and Egypt to prevent the fall in prices and to attempt to stabilise them by placing at the disposal of farmers and co-operatives very extensive credits on advantageous terms and also by market operations in the purchase of ever increasing stocks. But the results of this expensive intervention were not all that had been hoped for ; more so than in 1929 farmers in the United States and in Egypt did not follow the constantly re-iterated advice to reduce area sown which in the two countries

exceeded that of 1928-29. Egyptian production reached a record and that of America exceeded the crop of the previous season ; world production exceeded 125 million cents (26 million bales). As a matter of course it was impossible to check the fall in prices.

It is interesting to note the movement of exports during the last three seasons. Comparing them with the corresponding productions, the following percentages are obtained :

	From 1 - VIII - 27 to 31 - VII - 28						From 1 - VIII - 28 to 31 - VII - 29						From 1 - VIII - 29 to 31 - VII - 30					
	Production			Exports			Production			Exports			Production			Exports		
	thousand cent.	bales		thousand cent.	bales	%	thousand cent.	bales		thousand cent.	bales	%	thousand cent.	bales		thousand cent.	bales	%
United States	61,926	12,955		40,486	8,470	65.4	69,206	14,478		43,266	9,051	62.5	70,879	14,828		35,927	7,516	50.7
India	23,852	4,960		12,348	2,583	51.8	23,243	4,863		15,437	3,226	66.4	19,833	4,140		15,172	3,174	76.5
Egypt	6,030	1,261		6,640	1,389	110.1	7,992	1,672		7,848	1,642	98.2	8,250	1,726		6,367	1,332	77.2
Total	91,808	19,206		59,474	12,442	64.8	100,441	21,013		66,551	13,922	66.3	98,962	20,703		57,466	12,022	58.1

The percentages for exports have increased in India in proportion to the diminution in production while for the United States and Egypt the contrary has occurred with a resulting increase in stocks. Equating the total exports of the three countries to 100, their individual shares are calculated as follows :

	1927-28	1928-29	1929-30
United States	68.1	65.0	62.5
India	20.8	23.2	26.4
Egypt	11.1	11.8	11.1

Here also India is shown to advantage ; the United States has lost ground, while Egypt has shown practically no variation. In conclusion, with respect to the exports of the three countries considered, there was a decrease last season of 9 million cents (2 million bales) compared with the preceding season and of 2.0 million cents (0.4 million bales) compared with 1927-28 ; production on the other hand, showed a decrease of 1.5 (0.3) and an increase of 7.1 (1.5) respectively. The percentage of exports to production therefore shows a relatively large diminution, especially in the United States and Egypt.

There took place a corresponding increase in stocks, as is illustrated by the following figures :

		2-VIII-28			1-VIII-29			31-VII-30		
		centals	thousand bales		centals	thousand bales		centals	thousand bales	
United States	(1)	10,664	(1) 2,231		11,191	2,341		19,778	4,138	
Great Britain		3,805	796		4,270	893		4,158	870	
Continent		3,214	672		2,299	481		2,489	521	
Alexandria		1,521	318		1,601	335		3,543	741	
Bombay	(2)	4,777	(2) 999	(3)	4,063	(3) 850		3,680	770	

At the beginning of the season 1928-29 available stocks in the countries and ports above-mentioned amounted to about 24.0 million cents (5.0 million bales) of different origins ; at the beginning of last season there were 23.4 million (4.9) and this jumped to 33.7 (7.1) on 31 July 1930.

Contraction in demand has in part contributed to the increase in stocks. The fol-

(1) 31-VII-28. — (2) 26-VII-28. — (3) 25-VII-29.

lowing table, showing the imports for the season of the principal importing countries in thousands of centals and thousands of bales confirms this statement, already supported by the contraction in exports.

	Season 1927-28		Season 1928-29		Season 1929-30	
	centals	bales	centals	bales	centals	bales
Belgium	1,801	377	1,991	416	2,037	426
Czechoslovakia	3,318	694	3,047	637	2,701	565
France	7,873	1,647	8,177	1,711	8,223	1,720
Germany	9,720	2,034	8,931	1,868	8,944	1,871
Great Britain	12,793	2,676	15,763	3,298	13,181	2,758
Japan	12,200	2,552	14,943	3,126	13,073	2,735
Italy	4,647	972	5,232	1,094	5,148	1,077
<i>Totals</i>	<i>52,352</i>	<i>10,952</i>	<i>58,084</i>	<i>12,150</i>	<i>53,307</i>	<i>11,152</i>

There is thus an actual contraction in 1929-30 with respect to 1928-29 both in the countries indicated and in the minor importing countries, while on the other hand, with respect to 1927-28 there is an increase in the totals; the totals correspond to about 88 % of the total exports of the three large producers in 1927-28, 87.2 % in 1928-29; 92.8 % in 1929-30.

Taking the means of the prices in 1927-28 as equal to 100, the following index numbers result :

	Mean 1928-29	Mean 1929-30	Mean VIII/30	Mean XII/30
New Orleans : Middling.	95.0	81.0	60.5	48.1
Liverpool : Middling Am.	94.3	81.4	62.2	48.7
M. G. Broach, F. G.	90.3	70.8	45.8	41.6
Sakel. F. G. F.	93.5	74.7	58.9	41.5

The fall in prices begun in 1928-29 was thus accentuated in 1929-30 despite all defensive measures aimed at stabilisation and the present season began with prices about 60 % those of 1927-28, further lowered, on the mean for last December, to 41.48 %.

It is difficult to say precisely how far this decline in prices may be attributed to the world crisis and how far to overproduction, there having been in the period under consideration no contraction in demand sufficient to exercise a strong influence on prices but rather an absence of expansion proportionate to the increase in production and stocks. The crops of the last three seasons have certainly been abundant and have caused the accumulation of very large stocks and consequent excess of supply over demand. Add to this the decidedly unfavourable economic situation and the general tendency to decline in all agricultural products and it will be understood how impracticable it has been to retard the fall in prices, still more to stabilise them at an artificial level.

I. S.

Paraguay : According to the first preliminary estimate the production of ginned cotton in the season 1930-31 is calculated at 90,000 centals (20,000 bales), exceeding that of last season by about 9,000 centals (2,000 bales).

India : The final estimate of the area under cotton in 1930-31 in India is 23,531,000 acres against 25,177,000 in 1929-30 and 26,363,000, the average of the preceding five

seasons ; percentages : 93.5 and 89.2. Corresponding figures for production are : 1930-31 19,344,000 centals (4,047,000 bales) ; 1929-30 : 19,832,000 (4,149,000) ; average : 23,256,000 (4,865,000) ; percentages : 97.5 and 83.2.

Algeria : Last month's estimate of the cotton area harvested has been reduced by nearly 2,100 acres ; the estimate is 12,700 acres or 9 % below last year's area and 5 % below the five year average although previous estimates forecasted an extension of cultivation.

The estimate of production of ginned cotton was also reduced by nearly 4,200 centals (900 bales) while the production of seed was increased by 15,900 centals (790 sh. tons) compared with last month. The latest figures are : ginned cotton : 25,000 centals (5,300 bales) or 30.8 % smaller than last year's crop and 12.4 % above the average of 1924-25 to 1928-29.

These differences are the result of large damage caused by pink boll worm, by *Earias* and by adverse weather in December and January which hindered harvest ; the latter is at present proceeding normally.

Egypt. (Telegram of 16 March) : According to information from the Ministry of Agriculture the quantity of cotton ginned from 1 September 1930 (the beginning of the Egyptian cotton campaign) to 28 February 1931 are as follows, compared with those on 31 January last and 28 February 1930 in thousands of centals and bales :

		From 1/IX/30 to 28/II/31	From 1/IX/30 to 31/I/31	From 1/IX/29 to 28/II/30
Sakellaridis	(cent.)	1,442	1,292	2,083
	(bales)	302	270	436
Other varieties	(cent.)	4,306	3,997	4,694
	(bales)	901	836	982
Total lint	(cent.)	5,748	5,289	6,777
	(bales)	1,202	1,107	1,418
Linters	(cent.)	139	127	160
	(bales)	29	27	34
Total lint and linters	(cent.)	5,887	5,416	6,937
	(bales)	1,231	1,133	1,452

Uganda : The dry conditions prevailing generally during December and January affected the later sowings, and only small yields can be expected from these, while they hastened the maturity of the June, July and August sowings which are generally expected to yield above an average crop. In general the staple length and grade are above average.

At the middle of February the production of ginned cotton was forecasted at approximately 750,000 centals (150,000 bales) or about 50 % above that of last season (480,000 centals or 100,000 bales) and also well above the average of the preceding five years 681,000 (142,000). If production is to reach the amount forecasted however, normal weather conditions in Buganda will be necessary as in that province a good part of the cotton was sown much too late.

Anglo-Egyptian Sudan : According to the last estimate the area cultivated for cotton in 1930-31 is 387,000 acres against 369,000 in 1929-30 and 235,000, the mean of the five preceding seasons. Percentages : 104.9 and 164.9. The provisional estimate for production is 631,000 centals (132,000 bales) of ginned cotton against 665,000 (139,000) in 1929-30 and 508,000 (106,000), the five year mean. Percentages : 94.9 and 124.3.

FLAX

Belgium : A reduction in area is expected.

Irish Free State : Production of fibre in 1930 was 15,700 centals, 59.5 % of the 1929 output and 56.8 % of the quinquennial mean.

France : Owing to the persistent bad weather and the great difficulty experienced in working the land crops are expected to be very considerably behind.

Great Britain and Northern Ireland : In Northern Ireland the crop is giving fairly good yields of medium quality fibre.

Canada : The area of flax for fibre in 1930 in Canada is estimated at 6,143 acres compared with 6,280 in 1929 and 5,425, the average for 1924-28 ; percentages : 97.8 and 113.3. Data for the production of fibre are not available but the figures for seed and tow are as follows :

	1930	1929	Average 1924-28	Percentages 1929 = 100	
				1929 = 100	Av. 1924-28
Seed (centals)	34,800	18,500	29,500	188.8	118.3
(bushels)	62,200	33,000	52,600		
Tow (centals)	121,700	90,000	62,200	135.2	195.6
(sh. tons)	6,100	4,500	3,100		

Uruguay : The production of linseed in the season 1930-31, according to the preliminary estimate is placed at 3,172,000 centals (5,665,000 bushels) against 1,801,000 (3,216,000) in 1929-30 and 1,067,000 (1,905,000), the average for the preceding five seasons. The crop was particularly abundant, constituting a new record, having been favoured by the weather, conditions. In fact, while the percentage increase in the area for the season 1930-31 was 138.2 over that of 1929-30 and 229.9 over the five year average, the corresponding percentages for production were 176.1 and 297.4 respectively. The yield per acre was the highest so far recorded, approaching 8.0 centals (14.3 bushels) per acre.

India : In Bihar and Orissa light to moderate rains fell in many areas during the first three weeks of February with general precipitation at the end of this period. Crop condition was reported to be good. In the Central Provinces during the same period light to heavy rains fell in some areas. Condition of crops was mostly good. In the United Provinces condition was satisfactory.

Palestine : All crops in the northern area are showing very forward growth and heavy yields are expected. In village demonstration plots in the southern circle crops are excellent.

OTHER PRODUCTS

Tea.

Ceylon : Precipitation in January was normal and no losses are reported. On 1 February crop condition was average.

India : According to a report dated February 19 received from the government of India weather conditions in North India have been generally variable ; while seasonable conditions prevailed in South India although temperatures were low and the crop prospects could only be considered poor.

In North India no crop was harvested during the month of January. The outturn in South India, during the month of January was slightly ahead of that for the same date last year.

Coffee.

Surinam : Production and exports were larger in 1930 than in the year before. In the most important coffee producing area plantations were greatly damaged by drought in the last months of the year with the result that quality of the product was not so good and a smaller crop is expected this year.

Cacao.

Gold Coast : Weather in February favoured sun-drying of stored beans. The tendency of growers to hold for better prices continued in some localities during the first half of February, then gradually weakened and collapsed toward the end of the month. The quality of the beans leaving the ports continues to be above the average; later purchases are average. Crop movement is abnormally heavy, exceeding previous records, and owing to delays a considerable quantity is still available. Shipments by steamer in February amounted to 41,700 long tons (934,300 cents) compared with 30,000 (672,000) the average of the last four years; the total from 1 October to the end of February is 107,600 long tons (2,410,200 cents), against 148,300 (3,321,900) on the average of the last four years. The quantity arriving by rail at Takoradi and Accra in February was 31,700 long tons (711,200 cents) against 19,300 (432,300) the average of the last four years; the total to the end of February was 91,500 (2,049,600) against 135,000 (3,024,000) on the average of the four years.

Tobacco.

Italy : Preparation for sowings has been begun.

United States : In the last week of February tobacco beds had been prepared and the plants already set were doing well.

Porto Rico : Production of tobacco in Porto Rico in 1930-31 is estimated at 30,000,000 lbs. against 27,413,000 in 1929-30 and 32,163,000, the average for the preceding five seasons; percentages: 109.4 and 93.3.

Palestine : Transplanting is in progress in northern areas.

Turkey : According to non-official information the production of tobacco in 1930. is estimated at 100,000,000 lbs against 93,000,000 in 1929. Quality of the crop is better than in previous years. More favourable weather permitted picking and drying to take place in good time.

Algeria : Preparatory work was continuously hindered by persistent bad weather. In the East the cold, rain and hail retarded growth of sowings, damaging the young plants.

Hemp.

France : Owing to the persistent bad weather and the great difficulty experienced in working the land crops are expected to be very considerably behind.

Rapeseed, and Sesamum

Austria : At the beginning of March the crop condition of winter colza was 2.8 against 2.5 on February 1, of this year and 2.2 on March 1, 1930.

Hungary. (Telegram of 16 March) : Winter colza has from time to time suffered from frosts.

India : General rain fell in the third week of February in Bengal. Harvesting had made good progress by the end of the third week of February and standing crops were in good condition. In the Punjab rainfall was light to moderate but more was needed for standing crops, the condition of which was about the same as in the previous month. There was some further damage by insects.

Palestine : Ploughing is in progress.

TOTALS OF WORLD AGRICULTURAL PRODUCTION

The following totals have been obtained from the data in the tables published for each product in January, which have been revised and completed. With the name of each product is indicated the number of countries for which data for 1930 are at present available and also the percentage of their total production in 1929 to world production in the same year as published in the 1929-30 Yearbook, when they comprised nearly all producing countries except China.

Crop, number of countries comprised in the total, and percentages of world production	AREA					PRODUCTION									
	1930 and 1930-31	1929 and 1929-30	Average 1924 to 1928	Percentages for 1930 and 1930-31		BRITISH WEIGHTS			AMERICAN WEIGHTS			Percentages for 1930 and 1930-31			
			and 1924-25 to 1928-29	and 1929- 1930 = 100	Average age = 100	1930 and 1930-31	1929 and 1929-30	Average 1924 to 1928 and 1924-25 to 1928-29	1930 and 1930-31	1929 and 1929-30	Average 1924 to 1928 and 1924-25 to 1928-29	1929 and 1929- 1930 = 100	Average age = 100		
			thousand acres		%	%	thousand centials							%	%
Wheat (48 countr. 99.0 % a)	245,775	230,155	220,843	102.8	106.9	2,282,670	2,054,733	2,008,479	3,687,710	3,424,486	3,407,306	107.7	103.4		
Oats (30 countries 100.0 % a)	48,619	47,287	46,809	102.8	103.7	558,005	562,604	497,816	996,440	1,004,653	888,960	99.2	112.1		
Barley (42 countr. 92.0 % a)	61,041	62,781	54,095	97.2	112.8	606,458	725,275	600,651	1,450,980	1,511,016	1,251,379	96.0	116.0		
Rye (38 countries 99.0 % a)	103,746	102,481	104,428	101.2	99.3	1,166,046	1,191,492	1,170,286	3,643,860	3,723,387	3,657,118	97.9	99.6		
Rice (20 countries 81.0 % a)	141,507	141,383	140,383	100.1	100.8	1,555,986	1,937,508	1,905,797	2,778,554	3,450,846	3,403,213	80.3	81.6		
Wheat (rough) (10 countr. 83.0 % . . a)	100,664	107,023	107,386	102.5	102.1	1,686,143	1,592,830	1,583,945	3,740,900	3,530,571	3,519,808	105.9	106.5		
Potatoes (32 countr. 96.0 % a)	49,920	30,201	29,322	90.1	102.0	3,189,870	3,339,459	2,895,691	5,316,344	5,565,654	4,826,056	95.5	110.2		
Sugar-beet (22 countr. a) 23 countries 94.0 % . . b)	5,501	5,219	5,076	105.4	108.4	1,362,990	1,105,679	1,085,549	67,649	55,288	54,277	122.4	124.6		
Cotton (11 countr. a) 12 countries 87.0 % . . b)	71,830	73,873	72,942	97.2	98.5	97,178	100,981	104,235	84,370	62,170	62,956	135.7	134.0		
Linseed (17 countr. 66.0 % a)	15,704	12,820	14,426	122.5	108.9	68,701	50,885	70,683	20,330	21,126	21,806	96.2	93.2		
Flax (fibre) (14 countr. 66.0 % . . a)	697	764	744	91.3	93.7	2,026	3,424	3,450	22,283	22,435	22,704	99.8	98.6		
Flax (fibre) (6 countr. 50.0 % . . a)	267	279	282	96.6	94.7	2,370	2,357	2,577	22,680	90,866	126,219	135.0	97.2		
Tobacco (13 coun- tries 75.0 % . . . a)	3,025	2,933	2,592	103.1	116.7	25,289	24,105	22,730	292,554	342,379	345,025	85.4	84.8		
Wool (6 countries 89.0 % a)	126	143	126	87.9	100.0	1,100	1,493	1,155	230,908	235,675	257,721	100.6	92.0		
Wool (5 countr. 70.0 % a)	—	—	—	—	—	5,401	18,356	10,759	2,528,981	2,410,542	2,272,974	104.9	111.3		
Wool (14 c. 87.0 %).	—	—	—	—	—	(1)2,755,088 (1)3,426,822 (1)3,157,858	(1)3,308,607 (1)4,115,306 (1)3,792,304					80.4	87.2		
Wool (6 c. 99.0 %).	(2) 7,618 (2) 7,834 (2) 7,393			97.3	103.1	(3)1,052,259 (3)1,013,726 (3) 861,856	(3)1,052,259 (3)1,013,726 (3) 861,856					103.8	122.1		

a) Not including the U. S. S. R. — b) Including the U. S. S. R. — (1) Wine. — (2) Eggs in incubation. — (3) Cocoons.

FODDER CROPS

Austria : On 1 March the condition of the chief fodder crops was as follows : red clover 2.7 (against 2.5 on 1 February this year and 2.6 on 1 March 1930) ; lucerne 2.8 (3.0 and 2.7) ; mixed clover 2.4 (2.5 and 2.4) ; mixed fodder and vetches 2.7 (2.5 and 2.7) ; permanent meadows 2.5 (2.5 and 2.5) ; pastures 2.8 (2.7 and 2.7).

Belgium : Many low-lying pastures have been flooded or are inaccessible. The bad weather has hindered work in the fields.

Irish Free State : Pastures were bare in February and there was practically no growth save in sheltered spots, owing to the harshness of the weather.

Production of Fodder Crops, 1930.

	1000 centals	1000 sh. tons	% of 1929	% of 1924-25/ 1928-29
Hay	107,006	5,350	93.9	---
Turnips	71,142	3,557	86.3	95.0
Mangolds	35,315	1,766	89.7	109.2

France : Grass is growing well despite the bad weather and the pastures are green-
ing, save in the valley bottoms where the water is standing. On the other hand the
excessive humidity is lowering the quality of the grass which is of low nutritive value.

Preparations for sowing have been considerably hindered by the bad weather ;
early sowings have been made in unfavourable conditions particularly in the west and
sowings in general will be retarded. Owing to the abundance of the last crop and the
low level of prices it is expected that there will also be a reduction in areas sown.

The tables published last month not having been complete, the totals for fodder
production are given below :

	1930	1929	Mean 1924-28	Percentages 1929 = 100	Mean = 100
Mangolds, swedes, turnips, cabbages, Jerusalem arti- chokes :					
(1000 cent.) . .	984,614	751,693	668,501	131.0	147.3
(1000 sh. tons)	49,230	37,584	33,425		
Meadows and pastures :					
(1000 cent.) . .	1,079,490	782,908	934,690	137.9	115.5
(1000 sh. tons)	53,974	39,145	46,734		

When it is added that the winter crop of buckwheat, maize and millet, of which
the greater part is devoted to stock feeding, is also very considerable, it will be seen
that the available supplies of fodder this year are exceptionally plentiful. There is,
however, a deficit in oats and barley that may have a repercussion on horse-rearing.

Great Britain and Northern Ireland : The absence of severe frosts has been benefi-
cial to seeds, which in England and Wales were generally reported to be well forward.
In some areas, especially on heavy soils, growth was checked.

In Northern Ireland the production of turnips is estimated at 16,869,000 centals

(843,000 short tons), a decrease of 10.7 % on last year but an increase of 2.2 % on the five-year mean. The average yield was 18.7 tons per acre, against 20.1 last year and 16.6 in the ten-year period 1920-29. Production of mangolds is 471,000 centals (24,000 short tons) a decrease of 9.4 % on last year but an increase of 11.2 % on the average of the preceding five years. Average yield in this case was 18.3 tons per acre against 18.2 last year and 15.9 in the decennial period.

Italy: Fodder production on the whole is adequate for requirements. Growth on the marcite, pastures and meadows is good.

In the following table are given the preliminary data of area and of production in 1930 of fodder crops in terms of ordinary hay, compared with the final figures for 1929:

Crops	1930	1929	% 1930 1929 = 100
<i>Area (thousand acres).</i>			
Temporary meadows } excluding those in 1st year of growth	4,337	4,273	101.5
} those in the 1st year of growth (new meadows)	1,448	1,223	118.4
<i>Total</i>	5,785	5,496	105.3
Grass } annual	630	—	—
} mixed	736	—	—
Unirrigated permanent meadows	3,403	3,413	99.7
Irrigated permanent meadows	850	848	100.3
Permanent pastures	11,127	11,132	100.0
<i>Production.</i>			
Temporary meadows } excluding those in 1st year of growth . (ooo centals)	238,508	205,544	116.1
} those in 1st year of growth (new meadows) (ooo sh. tons)	11,930	10,277	
} those in 1st year of growth (new meadows) (ooo centals)	24,189	19,200	126.0
} (ooo sh. tons)	1,200	960	
<i>Total</i> { (ooo centals)	262,787	224,744	116.9
} (ooo sh. tons)	13,139	11,237	
Grass (ooo centals)	41,811	37,324	112.0
} (ooo sh. tons)	2,091	1,866	
Unirrigated permanent meadows (ooo centals)	78,835	68,174	115.6
} (ooo sh. tons)	3,942	3,400	
Irrigated permanent meadows (ooo centals)	56,476	52,640	107.3
} (ooo sh. tons)	2,824	2,632	
Permanent pastures (ooo centals)	68,877	60,775	105.1
} (ooo sh. tons)	3,194	3,030	
Accessory fodder production (ooo centals)	106,526	96,289	110.6
} (ooo sh. tons)	5,326	4,814	

Canada: Area and production of fodder crops in 1930 were as follows:

Crop	1930	1929	Average 1924-28	Percentages 1929 = 100	Average 1924-28 = 100
<i>Area (ooo acres)</i>					
Turnip, mangolds, etc.	226	205	199	110.0	113.6
Grain hay	1,798	1,647	1,813	109.2	99.2
Hay and clover	10,618	10,560	9,900	100.6	107.3
Alfalfa	744	799	742	93.1	100.2

Production.

Turnips, mangolds, etc. :					
(ooo centals)	41,064	36,228	38,394	113.3	107.0
(ooo sh. tons)	2,053	1,811	1,920		

(see over)

Crop	1930	1929	Average 1924-28	Percentages	
				1929 = 100	Average = 100
Production.					
Grain hay :					
(000 centals) .	63,180	41,980	88,392	150.5	71.5
(000 sh. tons) .	3,159	2,099	4,420		
Hay and clover :					
(000 centals) .	327,940	316,660	311,462	103.6	105.3
(000 sh. tons) .	16,397	15,833	15,573		
Alfalfa :					
(000 centals) .	32,800	36,700	36,268	89.4	90.4
(000 sh. tons) .	1,640	1,835	1,813		

The corresponding figures for fodder maize were given in the bulletin of last month.

Palestine : The first cut of bersim in unirrigated land is being made, and second growth is well forward on irrigated lands. Condition is excellent.

Egypt. (Telegram of 4 March) : Crop condition of bersim (*Trifolium alexandrinum*) on 1 March was 99 against 100 on 1 February last and 1 March 1930.

LIVESTOCK AND DERIVATIVES

International trade in butter and cheese in 1930 and the distribution of the imports into the principal countries of import according to origin (1).

Trade in dairy products in 1930 has been confronted with especially serious difficulties. On the one hand production has increased in consequence of the growth and improvement of dairy farms and thanks also to generally favourable weather conditions. On the other hand consumption decreased owing to the continued growth of unemployment in the consuming centres as well as to the general economic crisis. These circumstances were reflected in the fall of prices. The weakening of butter prices in 1930 was very marked.

I. — Export of butter from the principal exporting countries.

(thousand lbs)

COUNTRIES	1930	1929	COUNTRIES	1930	1929
Denmark	372,582	350,536	Finland	37,699	36,597
New Zealand	209,881	185,189	Estonia	31,085	27,377
Australia	126,325	102,956	Poland (with Danzig)	26,676	33,290
Netherlands	92,374	104,279	U. S. S. R.	26,015	55,998
Sweden	58,864	54,885	Lithuania	26,314	9,039
Irish Free State	58,864	62,832	France	12,125	16,755
Argentina	48,943	37,479			
Latvia	40,565	32,629	Total	1,158,312	1,100,811

(1) Export from U. S. S. R. during last three months is estimated at 8,818,320 lbs.

(1) For the development of international trade in butter and cheese from 1922 to 1929 see the "Monthly Crop Report and Agricultural Statistics", 1930, No. 3.

I. *Exports of butter and cheese from the principal exporting countries.* — As appears from the following table, the export of butter from New Zealand and from Australia rose during last year to very considerable proportions. Butter from these countries was sold at particularly low prices and weighed heavily on the market. Denmark exported much greater quantities in 1930 than in the previous year while exports from the Soviet Union seem to have diminished by more than half. In all, exports of butter from the countries under review grew by at least 44 million lb.

Cheese exports in 1930, as far as the most important countries of export are concerned, showed a tendency to fall off. The export trade of Canada in particular was in 1930 greatly depressed. Weather conditions in Canada, as in North America generally, owing to prolonged drought in summer and autumn, were not so favourable to dairy production as in other regions of production.

From this, as from the falling off in the cheese deliveries of Montreal, a decline in production may be deduced. For cheese of Italian origin market conditions at the beginning of the second half of 1930 were relatively favourable. Cheese exports from Italy rose with the from time to time satisfactory foreign demand. New Zealand also was able to increase its cheese export, which attained a level not far below that of the Netherlands.

II. — *Export of cheese from the principal exporting countries.*

(Thousand lbs.)

COUNTRIES	1930	1929	COUNTRIES	1930	1929
Netherlands	206,704	211,204	Switzerland	65,918	60,066
New Zealand	201,044	197,535	France	39,022	40,565
Italy	80,910	71,871	Denmark	12,566	14,551
Canada	67,021	93,035	Totale	674,175	698,427

II. *Imports of butter into the principal countries of import.* — For the international trade in butter Great Britain and Germany are by far the most important markets ; the British market above all is of the highest significance. Despite the difficult economic situation this market showed an increased absorptive capacity in the past year, while the quantities taken by Germany showed a falling off. Compared with 1929, Belgium and Luxemburg more than doubled their imports of butter, which had since 1923 undergone a severe contraction. Canada, which only a few years ago was a large exporter, further increased its import in 1930, due to the already mentioned relatively unfavourable weather conditions under which dairy farming laboured also in 1929. On the whole, the imports of the principal countries of import as well as the exports of the principal countries of export therefore increased.

III. — *Import of butter into the principal importing countries.*

YEARS	Great Britain and Northern Ireland	Germany	Canada	Belgium Luxemburg	Switzerland	France	Total
	(Thousand lbs.)						
1930	784,786	293,657	38,581	22,487	18,739	13,007	1,151,257
1929	716,505	296,302	35,935	9,480	16,755	9,700	1,084,677

The pronounced changes in the production of the leading butter-exporting countries in the postwar years have led to considerable modifications in the sources from which the

leading importing countries obtain their supplies. These modifications will now be considered first for Great Britain and Northern Ireland and then for Germany.

From the above table it is apparent that Denmark maintained the first place in the supply of the British market with butter and that the quantities from that country increased steadily during the period from 1925 to 1930. The second and third places are

IV. — *Countries from which butter is imported into Great Britain and Northern Ireland*

(Thousand lbs)

	1930	1929	1928	1927	1926	1925
TOTAL IMPORTS	764,784	716,494	684,632	651,684	651,710	655,564
<i>of which from</i>						
Northern Europe :						
Denmark	259,075	246,851	225,797	223,414	213,527	185,702
Sweden	31,342	27,810	19,664	18,587	17,256	9,121
Finland	26,153	26,162	22,275	22,980	20,898	19,000
Norway . . . . .	...	618	48	21	286	428
Total . . . . .	...	301,441	267,784	265,002	251,907	214,257
Eastern Europe (including the U. S. S. R.) :						
U. S. S. R.	18,531	32,515	37,660	39,247	29,377	32,729
Estonia . . . . .	...	12,346	8,086	6,755	6,572	2,384
Latvia . . . . .	...	9,071	5,601	4,190	6,744	2,941
Poland (including Danzig) . . . . .	...	7,771	3,246	1,717	1,579	11
Lithuania . . . . .	...	1,441	157	55	22	33
Total . . . . .	...	63,144	55,350	51,964	44,294	38,098
Western and Central Europe :						
Irish Free State	58,438	63,412	62,627	65,686	55,579	45,148
Netherlands	9,079	14,539	14,498	19,066	16,850	8,516
France	790	5,006	7,780	7,391	3,357	3,472
Germany . . . . .	...	1,141	340	138	318	18
Total . . . . .	...	84,008	85,245	92,281	76,104	57,154
North America :						
United States . . . . .	...	8	241	75	521	1,326
Canada . . . . .	...	1	184	47	7,124	18,203
Total . . . . .	...	9	425	122	7,645	19,529
Countries of the Southern Hemisphere :						
New Zealand	175,851	146,025	136,895	140,277	129,236	140,609
Australia	106,574	86,035	97,763	54,737	84,234	130,059
Argentina	46,385	33,922	40,994	47,046	57,590	54,264
Union of South Africa . . . . .	...	1,357	—	—	58	656
Total . . . . .	...	267,339	275,652	242,000	271,118	325,588
Total from British Empire . . . . .	...	297,085	297,538	260,861	276,368	334,799
Total from other countries . . . . .	...	419,409	387,114	390,823	375,342	320,765
Percentages (Total imports = 100)						
British Empire	—	41.5	43.5	40.0	42.4	51.1
Other countries	—	58.5	56.5	60.0	57.6	48.9

occupied by New Zealand and Australia ; while the import from the former also grew that from Australia showed a slight decline.

These countries together shipped to Great Britain last year about 23 million lb. of butter more than Denmark, while the imports from Denmark in 1929 as in 1927 and 1926 exceeded those of New Zealand and Australia together. Of the remaining export countries the Irish Free State and Argentina played, as before, a notable part in the supply of the British market. It may be noted that, amongst the Northern European countries after Denmark Sweden especially but also Finland were able to export greatly increased quantities to Great Britain. The Eastern European countries also increased their exports of butter to that market very considerably in the same period. On the other hand, the import into Great Britain from the Soviet Union has since 1928, and especially last year, diminished.

In Western and Central Europe, besides the Irish Free State, only the Netherlands is to be taken into account in the supply of butter to the British market, considering the large quantity of butter produced and the proximity of the Netherlands to that market, its exports to Great Britain are remarkably small. From North America Great Britain has in recent years taken scarcely any butter.

The proportion of the growing butter import of Great Britain obtained by British Empire countries since 1925, when it was rather more than half, has, it will be seen, diminished.

This is explained on the one hand by the diminished import of Australian butter and the disappearance of Canada as an exporting country, on the other hand by the pronounced growth of production in Northern Europe. In 1930, however, the proportion from the British Empire should have been considerably greater than in 1929.

With respect to 1925 the butter imports of Germany also have considerably increased. From the following table it will be seen that the part played by the overseas countries, in supplying Germany is, in opposition to that played in Great Britain, very limited and has since 1925 undergone considerable diminution in importance.

V. — Countries from which butter is imported into Germany.

(Tons and lbs)

	1930	1929	1928	1927	1926	1925
TOTAL IMPORTS	293,569	296,230	279,063	238,686	215,586	212,996
of which from						
Northern Europe :						
Denmark	96,918	97,017	88,988	74,953	67,380	76,185
Sweden	24,597	24,714	16,744	16,647	10,207	9,030
Finland	11,400	9,837	6,887	8,675	7,035	9,240
Norway	40	84	—	22	22	7
Total	132,961	131,652	112,619	100,297	84,644	94,462
Eastern Europe (including the U. S. S. R.) :						
Latvia	32,856	25,073	24,200	18,173	19,438	12,346
Estonia	19,903	15,223	16,010	12,901	11,371	11,010
Poland (including Danzig)	15,887	23,069	20,267	12,399	9,526	1,003
Lithuania	12,582	8,916	4,630	4,032	3,891	1,761
U. S. S. R.	6,912	13,927	19,683	14,425	11,978	15,781
Total	88,140	86,208	84,790	61,930	56,204	41,901
Central Europe :						
Austria	3,217	1,107	454	320	540	271
Hungary	2,284	1,021	357	258	—	15
Czechoslovakia	796	717	1,168	234	146	260
Switzerland	298	679	163	196	187	293
Total	6,595	3,524	2,142	1,008	873	839
Western Europe :						
Netherlands	62,517	72,213	73,505	68,970	66,875	61,011
Belgium-Luxemburg	1,517	2,075	2,877	2,231	2,099	989
France	66	55	847	1,814	24	31
Great Britain	15	—	66	13	13	1,907
Irish Free State	—	4	15	20	33	—
Total	64,115	74,347	77,310	73,057	69,040	63,888
North America :						
United States	37	11	4	—	18	381
Canada	—	—	2	106	165	2,388
Total	37	11	6	106	183	2,769
Countries of the Southern Hemisphere :						
New Zealand	1,182	35	79	26	262	1,817
Argentina	430	62	337	994	1,495	1,107
Australia	44	366	1,667	1,210	2,760	5,986
Total	1,656	463	2,083	2,230	4,517	8,910

Germany, like the United Kingdom, receives its largest quantity of butter from Denmark; the Netherlands takes second place, exporting its butter over the eastern front-

tier. For the remainder, the German market is chiefly supplied by the countries of northern and eastern Europe; butter imports from these countries have generally shown a large increase during recent years. The share of Poland in the supply, however, decreased considerably in 1930 and that of the U. S. S. R. had already begun to decline in 1929. Of the central European countries Austria and Hungary have recently placed steadily increasing quantities on the German market, although these quantities are still relatively small. Imports of butter into Germany from the Netherlands have slightly decreased in recent years but in 1930 still remained above those of 1925. Canada, which in 1925 marketed 2,383,009 lbs. in Germany, has been gradually completely eliminated as an exporter to Germany, as to Great Britain during the period under consideration.

Canada at present leads all butter importing countries other than Great Britain and Germany; its constantly increasing requirements have been met principally by shipments from New Zealand and Australia. Belgium and Luxemburg are principally supplied by the Netherlands and Denmark. In 1930, the shares of these two countries in the total imports of the Economic Union of Belgium and Luxemburg were about equal and represented about 75 %. Danish butter has recently found an increasing outlet on the Belgian and French markets and has maintained its predominance on the Swiss market.

III. *Cheese imports in the principal cheese importing countries.* -- As in the case of butter imports, the most important cheese importers are Great Britain and Northern Ireland and Germany. Variations in the turnover of cheese on the British and German markets showed last year a certain resemblance to those which occurred in the butter trade, the British market having absorbed larger quantities in comparison with 1929 and the German market smaller quantities. With reference to the other important consuming countries, the United States also imported less in 1930 corresponding to the higher tariff barrier, while France and Belgium and Luxemburg imported more.

VI. — *Imports of cheese into the principal importing countries.*

YEARS	Great Britain and Northern Ireland	Germany	United States	France	Belgium-Luxemburg	Total
			Thousand pounds			
1930	348,552	137,560	68,344	65,478	51,147	671,080
1929	335,324	146,608	76,280	52,249	46,518	656,979

While the total export of cheese from the principal exporting countries has diminished fairly considerably the total import of cheese in the principal importing countries has increased during the last year as may be seen from the above table. This striking phenomenon is explained by the fact that part of the quantities exported at the end of 1929 by distant countries is not included in the import statistics of the consuming countries until the beginning of 1930. The retrogressive tendency of international trade in cheese is not yet indicated by the import figures whereas it finds expression in those of export.

In attempting to express the importance of the different countries of supply of the British and German markets, on the basis of the tables given below relating to the origin of the quantities of cheese placed on these markets, it is obviously necessary not to lose sight of the fact that these quantities vary greatly according to the quality and value of the cheese in question; in this connection it is impossible to enter into detail with respect to such differences in the product.

VII. — *Countries from which cheese is imported into Great Britain and Northern Ireland.*

(Thousand lbs)

	1930	1929	1928	1927	1926	1925
TOTAL IMPORTS	348,592	335,333	336,587	336,297	337,574	341,864
of which imports from						
Northern Europe :						
Denmark . . . . .	...	721	1,020	991	889	545
Finland . . . . .	...	168	245	238	324	53
Norway . . . . .	...	42	13	12	19	16
Total . . . . .	...	931	1,278	1,241	1,232	614
Western Europe :						
Netherlands	20,505	21,020	25,501	25,539	21,279	15,891
France . . . . .	...	2,907	3,087	2,298	2,163	1,862
Belgium . . . . .	...	392	129	399	176	164
Irish Free State . . . . .	...	222	262	265	467	505
Total . . . . .	...	25,441	29,069	28,501	24,085	18,482
Other European countr. (includ. the U.S.S.R.) :						
Italy	16,201	14,786	15,850	15,839	15,815	18,022
Switzerland . . . . .	...	4,478	3,770	3,201	3,156	1,879
Germany . . . . .	...	313	178	111	283	157
U. S. S. R. . . . .	...	138	88	7	—	0
Total	—	19,715	19,886	19,152	19,254	20,058
North America :						
Canada	76,950	81,011	103,044	94,519	118,354	140,312
United States	486	800	610	1,925	1,478	2,003
Total	76,436	81,811	103,654	96,444	119,832	142,315
Oceania :						
New Zealand	219,621	201,733	174,089	180,529	167,653	155,848
Australia	5,361	5,564	8,262	3,975	5,262	9,055
Total	224,982	207,297	182,351	184,504	172,915	164,903
Total British Countries . . . . .	...	288,552	285,670	279,446	291,748	308,032
Total Other Countries . . . . .	...	46,780	50,917	50,851	45,826	41,022
Percentages (Total imports = 100)						
Total British Countries . . . . .	...	86.0	84.0	84.6	86.4	88.2
Total Other Countries . . . . .	...	14.0	15.1	15.4	13.6	11.8

Note: The data for the years 1925 to 1929 refer to hard-pressed cheese and only to both soft and hard-pressed cheese for those countries furnishing a large proportion of soft cheese to Great Britain, namely France and Switzerland.

The cheese import of Great Britain has not greatly increased since 1925. New Zealand is of quite predominant and increasing importance for cheese imports on the British market. Canada, which in 1925 still exported to Great Britain nearly the same quantity of cheese as did New Zealand, in 1930 could only dispose on the British market of about a third of the quantities shipped by its greatest competitor.

The Netherlands and Italy are of much smaller importance as exporters of cheese to Great Britain but are still far ahead of Australia and Switzerland; Northern and Eastern Europe, are comparatively negligible from this point of view. The British countries therefore contribute a very large part of the cheese supplies of the United Kingdom.

The figures given above demonstrate that the share of British countries in the total imports of the United Kingdom has slightly decreased since 1925. This may be explained on the one hand by the fact that the decline in imports from Canada and Australia has not been compensated for by the increase in imports from New Zealand and on the other hand also by the increase in deliveries on the British market by the Netherlands and Switzerland.

With regard to cheese supplies, the German requirements, in contrast to the situation in Great Britain, are only covered in very small part by overseas deliveries.

VIII. — *Countries from which cheese is imported into Germany.*

(Thousand lbs.)

	1930	1929	1928	1927	1926	1925
TOTAL IMPORTS	137,459	146,570	135,532	158,742	141,348	162,942
<i>of which imports from</i>						
Northern Europe:						
Denmark	11,255	13,629	11,020	10,188	14,246	18,422
Finland	4,524	4,991	3,772	7,571	6,638	10,708
Sweden	527	313	57	560	536	571
Norway	258	150	42	7	2	9
Total	16,564	19,092	15,500	18,326	21,422	29,710
Western Europe:						
Netherlands	85,304	90,434	80,694	95,787	80,775	77,224
France	2,747	4,202	5,126	3,913	3,713	4,894
Great Britain	2,568	3,384	3,181	3,086	807	866
Belgium-Luxembourg	344	403	553	600	789	1,687
Total	91,053	98,423	89,554	103,386	86,084	84,671
Central and Southern Europe:						
Switzerland	12,187	15,435	14,775	21,751	19,833	22,452
Italy	4,343	3,139	4,504	3,195	2,158	7,449
Czechoslovakia	3,300	1,521	1,700	3,183	2,251	1,299
Austria	2,196	1,885	1,808	961	970	805
Hungary	1,830	1,290	1,149	1,620	710	761
Yugoslavia	31	31	128	141	216	117
Total	23,887	23,310	24,244	30,851	26,138	32,883
Eastern Europe (including U. S. S. R.):						
Poland (including Danzig)	3,576	3,210	3,415	3,497	3,986	2,456
Lithuania	1,559	1,226	1,693	1,477	1,389	2,310
Latvia	425	154	73	258	97	397
U. S. S. R.	245	869	454	—	—	24
Estonia	29	49	11	174	282	615
Total	5,834	5,508	5,646	5,406	5,754	5,802
Extra-European Countries:						
New Zealand	57	40	42	31	4	40
Canada	40	97	500	609	1,583	6,098
United States	4	71	33	2	337	3,693
Total	101	208	575	732	1,924	9,831

Compared with 1925, the total imports of cheese into Germany shows a comparatively large decrease. Imports from the Netherlands form by far the largest proportion and have increased since 1925, decreasing slightly, however, in 1930. During last year, as in every year following 1926, the Netherlands furnished a quantity exceeding one half of the total German import of cheese. Switzerland and Denmark represent for Germany the most important sources of supply of cheese after the Netherlands; the quantities which they supplied to the German market decreased compared with 1929 and still more compared with 1925. The imports of cheese from Finland and Italy and also from France have also declined considerably since 1925. Some countries of Central Europe as well as Poland and Great Britain have, on the contrary, increased their exports to Germany. Imports of cheese from North America have been reduced to a minimum.

Of the other principal cheese importing countries the United States covers its needs chiefly by imports of Italian cheese representing about one half of the total cheese imports of the United States; Italy has improved its predominant position on this market in recent years at the expense of its greatest competitor, Switzerland. About one half of the French cheese imports are derived from the Netherlands; the remainder is mostly imported from Italy, the smaller proportion being furnished by Switzerland. The latter two countries have markedly developed their exports to France during the last few years. The Netherlands retains a predominant and steadily strengthening position on the Belgian market. Smaller quantities of cheese imported into Belgium and Luxemburg, are obtained principally from France and Switzerland.

E. P.

Condition of livestock and derivatives.

Belgium : Health is good.

Irish Free State : Stocks of fodder, roots and homegrown grain are adequate to meet normal demands until the end of the season. Milk yields in February were below normal.

Great Britain and Northern Ireland : In England and Wales demands on winter keep were heavier during February but not abnormal and it is usually anticipated that supplies will be quite adequate until the spring. In Scotland pastures are generally in poor condition and fodder supplies have now been exhausted in many districts; turnips have not kept well in some areas; there are, however, plentiful supplies of concentrated feeding stuffs though not of wheat bran. In Northern Ireland the supply of homegrown foodstuffs is generally regarded as adequate, though in some areas there, too, roots are reported to be scarce.

Milk yields were usually maintained but both in England and Wales and in Scotland showed a tendency to fall in some districts.

Hungary : On February 20, the condition of livestock was satisfactory.

Canada : The production of wool in Canada in 1930 is given as 21,016,000 lbs. against 20,283,000 in 1929 and 17,382,000, the average for 1924-28; percentages: 103.6 and 120.9. This estimate is based on the total number of sheep and lambs in Canada including those on the Indian reserves as published in our January bulletin. In arriving at the total it is assumed that the average fleece for sheep weighs 7 $\frac{1}{2}$ lbs. and for lambs 3 $\frac{1}{2}$ lbs.

United States : The favourable conditions which have persisted throughout the winter were continued during the last week of February; to date there have been practically no reports of losses or serious shrinkages and in some sections feeding has been very light. Over most of the great western grazing area livestock were doing well and lambing was progressing satisfactorily.

Livestock in Poland.

The estimate of numbers of livestock on agricultural farms (excluding those belonging to the army) which, since 1929 has been made every year on June 30, gave the following results in 1930 compared with the preceding year :

CLASSIFICATION	1930 (1)	1929	CLASSIFICATION	1930 (1)	1929
<i>Horses, total</i>	4,095,151	4,046,774	<i>Pigs, total</i>	5,018,098	4,828,641
Under 1 year of age	283,970	279,403	Under 6 months of age	3,143,920	2,300,224
From 1 to 3 years of age	286,630	288,129	From 6 to 10 months of age	1,370,784	1,185,472
From 3 to 4 years of age	282,616	290,023	10 months old and over	1,503,394	1,342,945
Over 4 years of age	3,261,935	3,189,118			
<i>Cattle, total</i>	9,389,898	9,056,749	<i>Sheep and goats, total (2)</i>	2,717,068	2,523,493
Under 1 year of age	1,496,131	1,414,124	under 1 year of age	1,034,276	951,537
From 1 to 3 years of age	2,055,206	2,123,143	1 year old and over	1,622,792	1,571,956
Over 3 years of age	5,837,471	5,519,482			

(1) Preliminary data.

(2) In 1930 the total number of goats was 227,121 of which 74,272 were under 1 year of age and 152,849 one year old and over.

Compared with 1929, the numbers of all kinds of livestock have increased: by 24.6 % for pigs, 7.7 % for sheep and goats, 3.7 % for cattle and 1.2 % for horses; pigs, sheep and goats having increased most.

With regard to the increase in the number of pigs it should be noted that their number in 1929 showed a large decrease compared with 1927, brought about by weather and economic conditions unfavourable to pig raising in the years 1928 and 1929. The figures for 1930 again approach those of 1927.

For sheep the data for 1930 exceed by about 30 % those estimated in 1927 (2,489,947 against 1,917,699), but it should be borne in mind that the two estimates were made at different periods: that of 1927 on September 30 and that of 1930 on June 30 and the latter figure refers to the period of the year in which the numbers of sheep reach their maximum.

The livestock numbers of 1930 exceed those of 1927 by 9.4 % in the case of cattle and by 0.5 % for horses.

Livestock in Argentina.

In the Bulletin of last December were published the preliminary estimates of the numbers of livestock in Argentina on July 1, 1930; these data being, however, incomplete as they did not cover the whole of the country and did not refer to all kinds. Complete data are now available and are given below together with the census results for 1914.

Year	Cattle	Sheep	Horses	Swine	Goats	Asses and mules	Poultry
1930 . .	32,212	44,413	9,858	3,769	5,647	1,039	37,323
1914 . .	25,867	43,225	8,324	2,901	4,325	825	24,691

A comparison of the two series of figures shows that an increase has taken place of all kinds. The largest increase is for cattle, the number of which is 6,345,000 head larger than in 1914. Next, in order of extent of increase, come horses, followed by goats, sheep and swine, the numbers of which have increased respectively by 1,534,000 head, 1,322,000, 1,188,000 and 868,000 over 1914.

There is also an increase of 214,000 head in the case of asses and mules. Poultry rearing is in full progress of development along rational lines, the increase of 12,632,000 head representing an increase of more than 50% over 1914.

Livestock in Guatemala.

In the following table are shown the data for livestock (including poultry) in Guatemala according to the census of 1930, compared with the estimates for 1928 and 1929.

Years	Cattle	Horses	Donkeys and Mules	Sheep	Goats	Pigs	Poultry
1930	416,397	63,117	37,049	183,537	21,413	79,251	359,960
1929	396,162	59,009	34,434	189,020	18,978	72,186	—
1928	297,793	52,520	27,154	240,501	23,841	89,363	—

There is decided tendency to increase in the cases of cattle, horses, donkeys and mules, while for sheep there is a continued diminution. The numbers of goats and pigs

have also decreased with respect to 1928 though they show a recovery as compared with 1929.

As regards sex, age and employment the 1930 census furnishes the following classification for cattle and horses :

Cattle.

for breeding :

pedigree	{ male	1,144
	{ female	11,227

native :

over 3 years	{ male	47,468
	{ female	167,996
under 3 years	{ male	35,677
	{ female	43,238

for work :

oxen	29,438
calves	29

for fattening :

calves	78,780
cows	1,400

Horses.

pedigree	{ male	51
	{ female	79

native :

over 3 years	{ male	34,152
	{ female	19,966
under 3 years	{ male	4,405
	{ female	4,464

Livestock in Algeria.

The following table gives the variations in the numbers of livestock in Algeria since the war compared with 1914.

The data refer to the spring of the year indicated.

Year	Sheep	Goats	Cattle	Horses	Asses	Mules	Camels	Pigs
1930	7,168	3,288	930	173	901	169	201	88
1929	6,196	3,050	897	163	296	165	175	89
1928	5,614	2,920	887	164	279	164	178	89
1927	5,083	2,652	840	162	275	164	155	96
1926	6,786	3,126	946	167	285	165	173	93
1925	6,171	3,033	892	161	282	161	176	80
1924	5,883	2,884	894	161	284	161	—	89
1923	5,397	2,621	794	157	268	155	146	107
1922	6,025	2,862	837	161	233	152	153	102
1921	6,333	3,062	851	162	246	155	150	114
1920	7,259	3,309	873	161	224	154	179	109
1919	8,516	3,806	950	157	271	156	204	126
1914	9,140	3,794	1,093	203	266	185	213	108

If exception is made of pigs, the number of which continues to decrease, the characteristic feature of this table is its illustration of the efforts to bring about a recovery in Algerian livestock numbers. For asses and mules the increase has been fairly constant but while the number of asses has grown rapidly and in 1930 exceeded the pre-war figure, for mules the recovery is slower and their number remains below that of 1914; in the case of horses there was no marked recovery until 1930. In all cases there is an increase over the figures for 1919 while the number of asses is greatly above the pre-war level.

If the two principal Algerian kinds of livestock are considered, firstly cattle and secondly sheep and goats, there may be noted, after a tendency to decrease in the years immediately following the war, a clearly defined recovery since 1924. The period 1924-1930 is characterised by considerable mortality in the winter of 1926-27, which greatly exceeded that previously recorded; despite this grave loss, efforts at reconstruction were not discontinued and in four years sheep flocks increased by over 2 million head, or about 40 %, goats by 23 % and cattle by 10 %. Algerian livestock in 1930 nearly reached their numbers in 1920 and in the case of cattle the number also equalled that of 1919, but still remained below the pre-war level.

In spite of the mishaps caused by the exceptional severity of the winter in some years, and the not altogether favourable economic conditions, Algerian livestock seems to be progressing well towards reconstruction.

The winter of 1930-31 dealt a serious blow at this reconstruction. Persistent drought gave rise to very bad water and feed conditions; mortality was very high and lambing took place under very bad conditions. It is also probable that there will be a retrogression to the numbers of 1927, if not even lower. These particularly grave crises, which since the war have periodically affected Algerian livestock, threaten to seriously hinder its final reconstruction.

TRADE

COUNTRIES	JANUARY				SIX MONTHS (August 1-January 31)				TWELVE MONTHS (August 1-July 31)	
	EXPORTS		IMPORTS		EXPORTS		IMPORTS		EXPORTS	IMPORTS
	1931	1930	1931	1930	1930-31	1929-30	1930-31	1929-30	1929-30	1929-30
Wheat. — Thousand cents (1 cental = 100 lbs).										
<i>Exporting Countries:</i>										
Bulgaria	0	0	0	82	827	31	0	875	66	930
Hungary	260	562	0	0	3,752	6,345	0	0	9,943	0
Lithuania	53	2	0	0	249	2	4	2	55	2
Rumania . . . . .	...	...	...	...	(1) 6,270 (1)	187 (1)	4 (1)	40	1,279	40
Yugoslavia	33	825	...	0	2,760	11,288	0	2	13,298	2
Canada	5,765	2,906	9	24	82,080	49,013	33	542	93,461	602
United States	774	4,947	891	595	26,965	36,822	6,790	2,350	57,274	7,885
Argentina	5,412	7,317	...	...	15,982	55,795	...	...	86,845	...
Chile . . . . .	...	...	...	...	(2) 392 (2)	7 (2)	0 (2)	0	481	0
India	57	11	575	677	1,859	234	1,929	1,989	2,758	3,931
Algeria . . . . .	...	...	...	...	(1) 4,632 (1)	1,497 (1)	88 (1)	487	3,206	545
Tunis	31	141	55	7	1,250	2,381	174	66	3,382	99
Australia	9,822	3,073	0	0	23,634	9,112	0	0	24,469	0
<i>Importing Countries:</i>										
Germany	46	128	1,162	6,140	236	2,116	9,612	19,923	2,293	31,725
Austria	0	9	417	350	84	11	2,161	2,998	68	6,455
Belgium	216	101	1,305	1,766	384	628	13,545	13,186	805	25,779
Denmark	0	35	564	254	15	97	2,213	1,764	128	2,903
Spain . . . . .	...	...	...	...	(2) 2 (2)	4 (2)	0 (2)	1,922	11	2,152
Estonia	0	0	20	55	0	0	207	295	0	540
Irish Free State	0	0	518	280	18	0	3,649	2,983	0	5,547
France	0	472	2,762	966	946	483	17,573	12,886	8,880	19,954
Gr. Brit. and N. Ir.	84	496	8,203	7,895	408	999	67,847	63,981	1,482	114,048
Greece . . . . .	...	...	...	...	(1) 0 (1)	0 (1)	5,512 (1)	5,183	0	12,330
Italy	0	0	3,501	1,268	22	4	24,242	6,504	4	27,150
Latvia	0	0	66	106	0	0	617	776	0	1,523
Norway . . . . .	...	...	139	132	...	...	1,894	1,224	...	2,216
Netherlands	174	99	2,273	741	216	154	9,749	7,500	231	14,936
Poland	77	79	7	22	1,076	108	33	198	249	331
Portugal . . . . .	...	...	37	18	...	...	141	604	...	3,732
Sweden	0	90	174	324	24	875	1,007	3,172	1,003	4,982
Switzerland	0	0	1,043	730	0	0	6,367	5,073	0	9,590
Czechoslovakia	0	13	46	220	2	64	4,531	1,883	108	3,602
Japan . . . . .	...	...	1,640	963	...	...	5,467	5,046	...	10,922
Syria and Lebanon . . . . .	...	...	...	...	(2) 84 (2)	0 (2)	11 (2)	51	26	146
Egypt . . . . .	...	...	...	...	(1) 2 (1)	7 (1)	353 (1)	0	49	24
Union of South Africa . . . . .	...	...	...	...	(2) 0 (2)	0 (2)	489 (2)	1,048	0	1,680
New Zealand . . . . .	...	...	...	...	(3) 0 (3)	44 (3)	33 (3)	42	130	170
Totals	22,964	21,396	25,401	23,613	175,951	177,653	187,185	164,596	312,064	316,432
Rye. — Thousand cents (1 cental = 100 lbs).										
<i>Exporting Countries:</i>										
Germany	37	683	88	208	1,182	7,059	406	1,237	10,529	1,922
Bulgaria	37	7	0	0	637	9	0	0	9	0
Hungary	216	134	0	0	1,067	1,053	0	0	2,919	0
Poland	276	915	0	2	4,279	3,770	0	13	7,293	20
Rumania . . . . .	...	...	...	...	(1) 602 (1)	340 (1)	0 (1)	0	377	0
Yugoslavia	37	108	2	18	399	814	112	110	1,325	254
Canada	0	4	0	0	0	26	4	0	33	0
United States	11	0	0	9	633	99	0	95	194	150
Argentina	20	13	...	...	46	1,290	...	...	1,378	...
Algeria . . . . .	...	...	...	...	421	712	...	...	767	...
<i>Importing Countries:</i>										
Austria	0	0	130	128	9	0	831	1,215	2	2,857
Belgium	7	0	324	86	18	2	1,862	522	7	983
Denmark	0	0	344	448	0	2	4,646	3,325	2	6,151
Estonia	0	0	7	128	0	0	55	620	0	1,593
Finland	0	0	18	29	0	0	1,210	2,421	4	3,314
France	0	0	55	2	0	2	514	141	7	181
Italy	0	0	31	15	0	0	337	64	0	324
Latvia	0	0	11	212	0	2	152	1,232	7	2,191
Lithuania	2	4	0	0	57	4	0	24	86	24
Norway	0	0	359	220	0	0	1,642	1,684	0	3,605
Netherlands	64	20	992	284	143	60	3,371	1,506	90	2,906
Sweden	0	0	18	194	0	9	392	1,197	11	2,240
Switzerland	0	0	9	15	0	0	108	108	0	154
Totals	767	1,901	2,388	2,998	9,517	15,819	15,943	15,514	25,073	26,843

(1) (2) (3) See notes page 181.

COUNTRIES	JANUARY				SIX MONTHS (August 1-January 31)				TWELVE MONTHS (August 1-July 31)	
	EXPORTS		IMPORTS		EXPORTS		IMPORTS		EXPORTS	IMPORTS
	1931	1930	1931	1930	1930-31	1929-30	1930-31	1929-30	1929-30	1929-30
Wheat flour. — Thousand cents (1 cental = 100 lbs).										
<i>Exporting Countries:</i>										
Germany	2	108	37	181	112	798	117	481	1,226	710
Belgium	15	18	18	75	95	174	134	531	251	564
Bulgaria	9	0	0	0	79	7	0	0	7	0
Spain	...	...	...	...	(2) 15 (2)	31 (2)	0 (2)	0	66	0
France	536	218	40	11	3,100	240	357	157	3,796	392
Hungary	187	472	0	0	2,822	3,690	0	0	5,664	0
Italy	104	132	11	2	659	963	88	26	1,400	93
Poland	51	4	2	2	373	46	13	22	154	35
Rumania	...	...	...	...	(1) 251 (1)	104 (1)	0 (1)	0	317	0
Yugoslavia	7	13	0	0	71	229	2	0	320	2
Canada	769	985	4	13	7,743	6,537	29	75	13,285	143
United States	1,852	2,430	0	0	13,647	13,825	2	0	25,234	2
Argentina	163	229	—	—	950	1,393	—	—	2,381	—
Chile	...	...	...	...	(2) 64 (2)	73 (2)	0 (2)	7	208	18
India	84	132	0	0	545	567	2	2	1,113	—
Japan	227	128	9	42	1,067	1,245	164	134	2,504	379
Algeria	...	...	...	...	(1) 185 (1)	46 (1)	18 (1)	31	134	57
Tunis	20	11	0	0	130	75	7	2	156	4
Australia	648	646	0	0	4,850	4,332	0	0	9,165	0
<i>Importing Countries:</i>										
Austria	0	0	192	276	2	2	1,217	1,064	4	3,772
Denmark	0	2	139	90	13	18	800	730	31	1,440
Estonia	0	0	7	7	0	0	62	64	0	123
Irish Free State	2	4	247	284	24	31	1,850	1,819	64	8,622
Finland	—	—	71	40	—	—	1,365	1,499	—	2,487
Gr. Britain and N. Ir.	346	414	785	807	2,394	2,474	6,865	6,226	4,727	12,487
Greece	—	—	...	...	—	—	(1) 95 (1)	273	—	494
Norway	0	0	31	42	2	2	701	650	2	1,376
Netherlands	15	31	370	216	66	126	2,081	1,166	203	2,760
Portugal	—	—	0	0	—	—	75	79	—	152
Sweden	0	11	2	46	2	60	49	196	90	379
Czechoslovakia	2	0	26	298	9	7	2,372	1,790	13	3,333
Ceylon	—	—	37	37	—	—	254	236	—	430
Java and Madura	—	—	...	...	—	—	(1) 384 (1)	399	—	1,142
Indo-China	—	—	...	...	—	—	(1) 201 (1)	225	—	549
Syria and Lebanon	...	...	...	...	(2) 2 (2)	0 (2)	51 (2)	180	0	425
Egypt	...	...	...	...	(1) 0 (1)	2 (1)	1,432 (1)	1,892	4	4,729
Union of South Africa	...	...	...	...	(2) 4 (2)	11 (2)	130 (2)	245	81	483
New Zealand	...	...	...	...	(3) 0 (3)	0 (3)	55 (3)	40	4	181
Totals	5,639	5,986	2,828	2,469	39,896	37,115	21,117	20,666	72,332	42,765
Barley. — Thousand cents (1 cental = 100 lbs).										
<i>Exporting Countries:</i>										
Bulgaria	126	20	0	0	1,025	229	0	0	309	0
Spain	...	...	...	...	(2) 71 (2)	46 (2)	0 (2)	4	163	0
Hungary	77	103	0	0	467	1,960	0	0	2,363	0
Lithuania	2	7	0	0	9	20	0	0	143	0
Poland	282	670	0	0	2,141	3,541	0	2	5,794	2
Rumania	...	...	...	...	(1) 23,680 (1)	23,235 (1)	0 (1)	0	31,965	0
Czechoslovakia	152	254	0	7	2,762	2,227	2	9	2,518	15
Yugoslavia	0	11	20	24	11	227	121	139	282	159
Canada	117	18	0	0	1,334	1,127	0	4	1,250	0
United States	316	276	—	—	2,862	6,856	—	—	8,774	—
Argentina	483	93	—	—	1,989	1,127	—	—	2,557	—
Chile	...	...	...	...	(2) 196 (2)	130 (2)	0 (2)	0	897	0
India	0	0	0	4	2	4	0	4	26	11
Syria and Lebanon	...	...	...	...	(2) 212 (2)	174 (2)	2 (2)	9	503	20
Algeria	...	...	...	...	(1) 1,041 (1)	1,735 (1)	4 (1)	123	2,202	130
Egypt	...	...	...	...	(1) 2 (1)	57 (1)	40 (1)	9	128	40
Tunis	2	71	53	2	157	2,204	207	20	2,852	58
Australia	223	62	0	0	681	205	0	0	324	0
<i>Importing Countries:</i>										
Germany	0	11	2,617	15,404	60	31	9,489	38,486	1,089	49,765
Austria	0	2	132	120	0	7	1,080	939	9	1,653
Belgium	148	31	1,067	745	205	68	5,701	4,381	176	7,867
Denmark	172	234	1,651	174	754	1,124	9,145	721	1,232	4,456
Estonia	—	—	0	4	—	—	13	35	—	68
Irish Free State	0	0	11	2	20	24	20	7	26	333
France	2	18	739	55	13	97	3,671	1,047	348	1,437
Gr. Britain and N. Ir.	7	0	1,929	1,067	18	22	12,652	9,145	33	14,454
Greece	—	—	...	...	—	—	(1) 51 (1)	271	—	401
Italy	0	0	68	31	0	9	430	123	9	368
Latvia	0	0	15	2	0	0	137	73	0	123
Norway	0	0	210	84	0	0	650	351	0	752
Netherlands	78	110	1,569	445	201	328	8,629	3,854	487	7,334
Switzerland	0	0	359	108	0	0	1,541	1,166	0	1,918
Totals	2,181	2,631	10,436	18,344	39,913	46,883	53,585	60,922	65,659	91,967

(1) (2) (3) See notes page 181.

COUNTRIES	JANUARY				SIX MONTHS (August 1-January 31)				TWELVE MONTHS (August 1-July 31)	
	EXPORTS		IMPORTS		EXPORTS		IMPORTS		EXPORTS	IMPORTS
	1931	1930	1931	1930	1930-31	1929-30	1930-31	1929-30	1929-30	1929-30
Oats. — Thousand centals (1 cental = 100 lbs).										
<i>Exporting Countries:</i>										
Germany	2	1,215	79	148	205	7,727	185	450	15,245	620
Irish Free State	29	62	13	4	181	452	128	15	661	121
Hungary	2	33	22	0	11	531	29	0	728	0
Lithuania	11	15	0	0	80	31	0	0	179	0
Poland	7	117	0	2	90	739	0	46	1,803	66
Rumania . . . . .	...	...	...	...	(1) 1,155	(1) 919	(1) 0	(1) 0	1,834	0
Czechoslovakia	73	115	0	2	677	802	4	31	1,345	128
Yugoslavia	0	0	0	0	0	0	73	2	9	51
Canada	88	13	0	106	690	355	229	710	679	1,182
United States	9	49	88	9	79	1,215	110	22	1,576	49
Argentina	1,105	694	—	—	0,171	2,231	—	—	6,563	—
Chile . . . . .	...	...	...	...	(2) 802	(2) 161	(2) 0	(2) 0	622	0
Algeria . . . . .	...	...	...	...	(1) 642	(1) 212	(1) 86	(1) 106	503	128
Tunis	13	26	0	0	359	575	9	0	890	0
<i>Importing Countries:</i>										
Austria	0	0	141	102	2	0	906	1,327	2	2,707
Belgium	0	0	220	271	2	2	1,911	1,285	4	2,773
Denmark	4	4	77	220	7	13	434	946	20	2,800
Estonia	0	0	2	2	0	0	29	20	0	106
Finland	2	0	2	9	4	0	60	207	0	476
France	2	2	95	99	9	11	1,021	1,191	77	1,671
Gr. Brit. and N. Ire.	9	15	798	644	37	37	5,448	4,129	306	9,658
Greece . . . . .	—	—	...	...	—	—	(1) 0	(1) 112	—	217
Italy	0	0	489	115	0	0	2,234	655	0	1,700
Latvia	4	0	0	0	4	0	13	82	163	99
Norway	0	0	0	0	0	0	0	57	2	170
Netherlands	9	22	271	357	31	82	1,748	2,070	185	3,728
Sweden	4	7	68	123	15	35	498	838	60	1,290
Switzerland	0	0	509	338	0	0	2,416	2,187	0	4,398
Australia	11	2	0	0	42	11	0	2	49	4
Totals	1,384	2,391	2,814	2,636	11,275	16,150	17,616	16,487	33,475	34,132
Maize. — Thousand centals (1 cental = 100 lbs).										
					THREE MONTHS (November 1-January 31)				TWELVE MONTHS (Nov. 1-Oct. 31)	
<i>Exporting Countries:</i>										
Bulgaria	254	364	0	0	1,041	946	0	0	4,017	0
Hungary	42	681	60	0	161	1,942	154	4	3,351	132
Rumania . . . . .	...	...	...	...	(1) 4,059	(1) 6,451	(1) 0	(1) 0	23,424	2
Yugoslavia	602	899	0	4	2,447	3,653	7	9	12,013	33
United States	71	421	75	18	159	1,246	304	34	4,303	708
Argentina	12,496	6,751	—	—	36,965	23,219	—	—	96,197	—
Brazil . . . . .	...	...	...	...	(2) 11	(2) 132	—	—	328	—
Java and Madura . . . . .	...	...	...	...	(1) 33	(1) 0	—	—	1,759	—
Indo-China . . . . .	...	...	...	...	(1) 1,316	(1) 961	—	—	2,339	—
Syria and Lebanon . . . . .	...	...	...	...	(2) 13	(2) 79	(2) 2	(2) 0	434	35
Egypt . . . . .	...	...	...	...	(1) 0	(1) 2	(1) 15	(1) 4	97	33
Union of South Africa . . . . .	...	...	...	...	(2) 946	(2) 575	(2) 0	(2) 0	12,267	0
<i>Importing Countries:</i>										
Germany	0	0	880	2,562	0	0	1,786	5,613	0	16,506
Austria	0	0	417	410	0	4	1,202	1,122	18	4,812
Belgium	62	20	1,369	1,155	106	75	3,657	3,415	220	12,908
Denmark	0	0	959	747	0	0	2,150	1,593	0	6,850
Spain . . . . .	...	...	...	...	(2) 0	(2) 0	(2) 108	(2) 686	0	3,640
Estonia . . . . .	...	...	0	0	0	0	0	0	0	0
Irish Free State	0	0	657	529	0	0	2,094	1,748	29	8,047
Finland . . . . .	...	...	22	0	...	...	51	33	...	187
France	4	2	1,537	1,065	15	4	5,884	5,128	46	17,357
Gr. Brit. and N. Ir.	190	154	5,344	3,117	580	344	14,817	9,969	2,150	36,596
Greece . . . . .	...	...	...	...	...	...	(1) 13	(1) 40	...	185
Italy	0	0	844	1,382	...	2	3,865	3,915	7	15,252
Norway . . . . .	...	...	212	190	...	...	807	472	...	2,676
Netherlands	44	82	3,393	2,707	115	126	8,869	6,537	626	23,208
Poland	0	0	18	24	0	0	77	82	4	392
Portugal . . . . .	...	...	106	44	...	...	780	280	...	1,442
Sweden . . . . .	...	...	467	203	...	...	1,862	399	...	2,262
Switzerland	0	0	201	231	0	0	946	769	0	2,542
Czechoslovakia	0	0	809	467	0	0	2,255	1,825	2	5,443
Canada	0	0	392	547	4	0	1,619	2,846	4	7,573
Japan . . . . .	...	...	106	157	...	...	302	377	...	1,486
Tunis	0	0	40	0	0	0	110	0	2	0
Totals	13,765	9,383	17,998	15,538	47,063	39,761	52,586	46,460	168,637	169,067

(1) (2) See notes page 181.

COUNTRIES	JANUARY				TWELVE MONTHS (January 1-December 31)				TWELVE MONTHS (January 1-Dec. 31)	
	EXPORTS		IMPORTS		EXPORTS		IMPORTS		EXPORTS	IMPORTS
	1931	1930	1931	1930	1930	1929	1930	1929	1929	1929
Rice. — Thousand cents (1 cental = 100 lbs).										
<i>Exporting Countries:</i>										
Spain	...	...	...	...	(1) 1,105 (1)	635 (1)	0 (1)	0	—	—
Italy	412	320	0	4	4,716	4,308	134	556	—	—
United States	379	324	44	53	2,621	3,983	293	359	—	—
India	3,276	3,049	7	9	57,323	45,149	139	578	—	—
Indo-China	...	...	...	...	24,063	32,443	—	—	—	—
Siam	2,141	2,577	—	—	20,698	22,893	—	—	—	—
Egypt	...	...	...	...	1,206	1,702	251	359	—	—
<i>Importing Countries:</i>										
Germany	60	123	231	251	1,594	2,557	5,503	6,576	—	—
Austria	0	0	55	44	0	0	606	631	—	—
Belgium	13	0	35	77	9	26	1,047	873	—	—
Denmark	0	0	13	18	0	0	139	174	—	—
Estonia	—	—	2	2	—	—	35	49	—	—
Irish Free State	0	0	4	—	0	0	46	—	—	—
France	73	148	351	176	1,903	2,399	5,650	5,900	—	—
Gr. Brit. and N. Ir.	15	18	128	176	218	262	2,564	2,665	—	—
Greece	—	—	...	...	—	—	536	547	—	—
Hungary	0	2	31	31	9	—	388	620	—	—
Latvia	0	0	15	4	7	31	82	192	—	—
Lithuania	0	0	2	2	0	0	31	53	—	—
Norway	—	—	11	9	—	—	101	106	—	—
Netherlands	132	128	247	71	2,095	2,015	3,583	3,642	—	—
Poland	9	4	0	183	126	66	1,177	1,241	—	—
Portugal	—	—	22	79	—	—	941	908	—	—
Sweden	—	—	0	0	—	—	161	117	—	—
Switzerland	0	0	44	26	0	0	408	425	—	—
Czechoslovakia	0	0	44	57	0	0	979	1,067	—	—
Yugoslavia	0	0	40	26	2	2	516	562	—	—
Canada	0	0	71	35	0	4	584	560	—	—
Chile	—	—	...	...	—	(1) 472 (1)	441	441	—	—
Ceylon	2	2	952	1,162	9	13	10,809	11,325	—	—
Java and Madura	...	...	...	...	117	207	5,487	7,624	—	—
Japan	320	4	101	401	1,252	101	3,973	4,057	—	—
Syria and Lebanon	...	...	...	...	(1) 2 (1)	0 (1)	287 (1)	285	—	—
Algeria	...	...	...	...	9	18	104	95	—	—
Tunis	0	0	2	2	0	0	24	22	—	—
Union of S. Africa	...	...	...	...	(a) 0 (a)	0 (a)	862 (a)	743	—	—
Australia	11	7	4	9	71	77	75	445	—	—
New Zealand	...	...	...	...	(g) 0 (g)	0 (g)	57 (g)	55	—	—
Totals	6,843	6,796	2,454	2,989	119,595	118,848	48,004	53,896		
Linseed. — Thousand cents (1 cental = 100 lbs).										
<i>Exporting Countries:</i>										
Estonia	0	0	0	55	64	2	24	—	—	—
Lithuania	60	40	0	0	443	545	—	—	—	—
Argentina	4,822	4,475	—	—	27,216	35,700	—	—	—	—
India	108	117	0	0	5,783	5,514	0	2	—	—
Tunis	...	...	0	0	9	22	0	0	—	—
<i>Importing Countries:</i>										
Germany	0	2	500	265	26	84	5,104	6,967	—	—
Belgium	7	2	280	176	68	209	1,676	2,515	—	—
Denmark	—	—	29	2	—	—	359	322	—	—
Spain	—	—	...	...	—	(1) 412 (1)	397	—	—	—
Finland	0	0	11	0	0	0	79	176	—	—
France	2	2	214	254	15	15	4,288	4,722	—	—
Gr. Brit. and N. Irel.	0	0	452	145	9	9	5,031	6,371	—	—
Greece	...	...	...	...	2	4	84	88	—	—
Hungary	0	0	0	0	143	44	106	71	—	—
Italy	0	0	77	29	0	2	1,175	1,301	—	—
Latvia	26	11	4	9	236	340	108	881	—	—
Norway	—	—	33	18	—	—	357	324	—	—
Netherlands	4	15	470	187	146	148	5,617	7,960	—	—
Poland	2	11	4	0	31	322	150	459	—	—
Sweden	—	—	9	2	—	—	798	778	—	—
Czechoslovakia	0	0	18	7	18	11	445	624	—	—
Yugoslavia	0	0	4	0	2	0	121	130	—	—
Canada	0	0	0	0	783	476	454	769	—	—
United States	—	—	196	602	—	—	7,090	13,576	—	—
Japan	—	—	9	0	—	—	126	851	—	—
Australia	0	0	15	42 (1)	0 (1)	0 (1)	340 (1)	586	—	—
Totals	5,931	4,675	2,796	1,741	34,965	43,509	34,632	48,894		

(1) (a) (g) See notes page 181

COUNTRIES	JANUARY				TWELVE MONTHS (January 1-December 31)				TWELVE MONTHS (January 1-Dec. 31)	
	EXPORTS		IMPORTS		EXPORTS		IMPORTS		EXPORTS	IMPORTS
	1931	1930	1931	1930	1930	1929	1930	1929	1929	1929
Butter. — (Thousand lbs.)										
<i>Exporting Countries:</i>										
Austria	448	485	2	13	4,112	2,211	545	1,098	—	—
Denmark	31,072	31,070	9	31	372,558	350,620	1,389	1,424	—	—
Estonia	1,448	1,574	0	0	31,010	27,247	0	0	—	—
Ireland Free State	364	631	430	829	58,815	62,836	3,391	4,542	—	—
Finland	3,287	3,347	0	0	37,726	36,610	7	2	—	—
France	761	545	2,970	2,222	12,095	16,722	12,924	9,753	—	—
Hungary	284	534	0	0	3,430	1,191	40	143	—	—
Latvia	2,379	2,923	2	4	40,630	32,624	49	49	—	—
Lithuania	629	518	0	0	16,219	9,004	0	0	—	—
Netherlands	5,022	6,916	933	417	92,394	104,325	4,396	4,469	—	—
Poland	1,676	1,720	2	0	26,714	33,248	29	112	—	—
Sweden	4,451	5,644	0	0	58,857	54,977	18	24	—	—
U. S. S. R.	—	—	—	—	(4) 17,229 (4)	49,675	—	—	—	—
Argentina	6,490	5,730	—	—	48,808	37,547	—	—	—	—
India	57	60	29	23	551	522	282	229	—	—
Syria and Lebanon	—	—	—	—	(1) 1,916 (1)	1,951 (1)	170 (1)	216	—	—
Australia	19,313	13,616	0	0	126,411	102,019	2	4	—	—
New Zealand	20,123	32,529	—	—	209,771	183,630	—	—	—	—
<i>Importing Countries:</i>										
Germany	20	31	17,110	24,798	578	337	293,560	296,230	—	—
Belgium	168	168	3,865	1,640	2,648	2,877	22,412	9,559	—	—
Spain	—	—	—	—	(1) 157 (1)	163 (1)	324 (1)	348	—	—
Gr. Brit. and N. Irel.	4,176	2,504	75,645	72,019	21,028	14,839	764,782	716,492	—	—
Greece	—	—	—	—	—	—	—	—	—	—
Italy	49	31	765	256	1,843	1,420	3,115	1,637	—	—
Norway	90	86	26	35	236	1,191	1,530	1,909	—	—
Switzerland	0	4	1,526	1,329	42	159	18,786	16,649	—	—
Czechoslovakia	132	108	15	0	694	714	836	836	—	—
Canada	66	62	448	7,538	1,170	1,400	38,605	35,929	—	—
United States	225	313	110	132	2,967	3,913	2,471	2,773	—	—
Ceylon	—	—	60	46	—	—	723	738	—	—
Java and Madura	—	—	—	—	—	—	7,557	7,710	—	—
Japan	—	—	40	86	—	—	611	503	—	—
Algeria	—	—	—	—	82	64	3,232	2,207	—	—
Egypt	—	—	—	—	42	29	2,417	1,649	—	—
Tunis	0	0	82	79	13	18	829	717	—	—
Totals	108,710	111,149	104,078	111,496	1,191,013	1,135,226	1,186,330	1,119,296	—	—
Cheese. — (Thousand lbs.)										
<i>Exporting Countries:</i>										
Denmark	787	1,188	64	60	12,626	14,513	809	648	—	—
Finland	622	362	2	2	4,663	4,837	35	44	—	—
Italy	4,806	4,700	525	683	80,974	71,803	12,562	13,975	—	—
Lithuania	187	115	0	0	1,960	1,299	11	11	—	—
Norway	117	101	40	57	1,380	1,347	750	840	—	—
Netherlands	14,861	16,464	110	157	206,739	211,237	1,510	1,446	—	—
Poland	216	157	60	90	3,267	3,907	1,074	1,351	—	—
Switzerland	4,458	5,262	452	386	66,146	69,737	4,251	3,437	—	—
Czechoslovakia	946	342	163	190	8,274	7,050	2,963	3,349	—	—
Yugoslavia	29	304	15	24	4,583	4,890	300	370	—	—
Canada	917	1,552	84	168	66,955	92,945	1,779	2,103	—	—
Australia	527	29	2	24	7,273	5,135	150	600	—	—
New Zealand	20,675	28,118	0	0	201,868	197,552	4	7	—	—
<i>Importing Countries:</i>										
Germany	509	560	9,471	11,543	5,410	4,919	137,459	146,570	—	—
Austria	425	86	313	309	4,432	2,923	5,637	5,717	—	—
Belgium	60	66	4,317	4,244	875	899	51,106	46,456	—	—
Spain	—	—	—	—	(1) 190 (1)	60 (1)	5,157 (1)	6,105	—	—
Ireland Free State	13	13	262	205	194	154	2,350	2,410	—	—
France	2,626	2,853	5,492	4,390	38,921	40,609	65,524	52,173	—	—
Gr. Brit. and N. Irel.	677	783	26,136	37,836	8,927	9,976	348,592	385,381	—	—
Greece	—	—	—	—	262	355	2,302	3,314	—	—
Hungary	11	4	37	44	93	40	386	547	—	—
Portugal	—	—	24	53	—	—	1,010	974	—	—
Sweden	—	—	77	132	—	—	1,470	1,420	—	—
United States	196	196	4,123	5,359	2,180	3,020	68,313	76,382	—	—
India	0	0	132	123	7	7	1,133	1,237	—	—
Java and Madura	—	—	—	—	—	—	1,671	1,821	—	—
Syria and Lebanon	—	—	—	—	(1) 122 (1)	196 (1)	582 (1)	635	—	—
Algeria	—	—	—	—	212	194	10,397	8,498	—	—
Egypt	—	—	—	—	60	123	7,553	6,568	—	—
Tunis	0	0	196	134	29	13	1,746	1,696	—	—
Totals	53,665	61,334	53,997	66,153	729,647	749,740	736,596	735,999	—	—

(1) (4) See notes page 181.

COUNTRIES	JANUARY				SIX MONTHS (August 1-January 31)				TWELVE MONTHS (August 1-July 31)	
	EXPORTS		IMPORTS		EXPORTS		IMPORTS		EXPORTS	IMPORTS
	1931	1930	1931	1930	1930-31	1929-30	1930-31	1929-30	1929-30	1929-30
Cotton. — Thousand cents (1 cental = 100 lbs).										
<i>Exporting Countries:</i>										
United States . . .	2,859	3,896	57	258	24,112	20,138	152	950	5,927	1,889
Argentina . . .	4	2	—	—	209	163	—	—	538	—
Brazil . . .	—	—	—	—	(2) 163	(2) 648	—	—	1,351	—
India . . .	1,728	1,784	243	29	7,024	6,324	606	176	15,172	600
Egypt . . .	—	—	—	—	(1) 2,760	(1) 3,256	0 (1)	0	1,367	0
<i>Importing Countries:</i>										
Germany . . .	117	179	853	1,001	915	941	4,908	5,287	1,855	8,944
Austria . . .	0	0	40	49	0	2	247	298	2	562
Belgium . . .	18	9	130	181	71	64	785	1,027	106	2,037
Denmark . . .	—	—	15	24	—	—	73	75	—	146
Spain . . .	—	—	—	—	(1) 7 (1)	22 (1)	644 (1)	556	44	2,207
Estonia . . .	0	0	7	22	0	0	44	84	0	130
Finland . . .	0	0	13	18	0	0	97	86	2	143
France . . .	44	46	855	1,043	289	302	4,791	4,639	668	8,272
Gr. Brit. and N. Irel.	29	40	1,113	1,720	260	311	6,521	8,206	799	13,181
Greece . . .	—	—	—	—	(1) 0 (1)	0 (1)	88 (1)	26	2	68
Hungary . . .	—	—	22	37	—	—	148	157	—	291
Italy . . .	0	0	430	589	2	4	1,859	2,652	9	5,148
Latvia . . .	0	0	4	7	0	0	44	42	0	77
Norway . . .	—	—	7	4	—	—	31	26	—	46
Netherlands . . .	0	0	132	121	2	4	529	545	7	1,027
Poland . . .	2	2	84	110	11	15	791	692	26	1,215
Portugal . . .	—	—	11	44	—	—	174	214	—	401
Sweden . . .	—	—	37	49	—	—	249	200	—	516
Switzerland . . .	0	0	73	82	0	0	362	379	0	639
Czechoslovakia . . .	11	15	194	287	84	90	1,279	1,415	170	2,701
Yugoslavia . . .	0	0	15	18	0	0	95	88	0	198
Canada . . .	—	—	104	108	—	—	611	635	—	1,043
Japan . . .	31	26	1,230	1,739	276	108	5,404	6,199	417	13,073
Algeria . . .	—	—	—	—	(1) 2 (1)	4 (1)	0 (1)	2	33	4
Totals . . .	4,843	6,901	5,669	7,535	36,187	38,303	38,532	34,725	63,495	64,558
Wool. — (Thousand lbs).										
(FIVE MONTHS (September 1-January 31) Twelve months (Sept. 1-August 31))										
<i>Exporting Countries:</i>										
Spain . . .	—	—	—	—	(2) 2,163 (2)	3,120 (2)	915 (2)	408	8,062	5,781
Irish Free State . . .	368	439	60	90	2,568	5,505	271	507	10,249	994
Hungary . . .	117	146	276	139	1,250	2,619	838	622	10,013	1,561
Argentina . . .	33,418	43,938	—	—	98,988	97,021	—	—	301,402	—
Chile . . .	—	—	—	—	(2) 20,038 (2)	207	—	—	20,318	—
India . . .	2,608	2,564	134	384	13,413	24,280	573	1,138	47,825	4,189
Syria and Lebanon . . .	—	—	—	—	(2) 2,800 (2)	4,971 (2)	1,559 (2)	414	7,485	1,810
Algeria . . .	—	—	—	—	(1) 8,640 (1)	4,945 (1)	304 (1)	364	14,897	1,985
Egypt . . .	—	—	—	—	(1) 897 (1)	1,151 (1)	2 (1)	0	2,533	2
Tunis . . .	0	35	24	26	64	243	408	366	551	1,118
Un. of S. Africa ^{a)}	—	—	—	—	(2) 67,993 (2)	77,925 (2)	33 (2)	0	288,877	—
^{b)}	—	—	—	—	(2) 946 (2)	1,299 (2)	401 (2)	161	7,401	298
Australia . . . ^{a)}	47,536	34,013	205	849	412,347	332,255	467	1,523	738,162	2,837
^{b)}	1,872	2,284	0	82	16,910	18,343	37	291	47,375	66
New Zealand . . . ^{a)}	25,214	32,792	0	0	45,257	53,184	0	2	156,771	13
^{b)}	1,691	2,734	0	0	9,498	10,992	0	7	43,473	7
<i>Importing Countries:</i>										
Germany . . . ^{a)}	260	1,323	20,656	40,995	3,239	7,066	100,264	91,558	11,188	204,117
^{b)}	646	1,118	1,995	2,125	4,969	7,225	11,629	12,990	14,966	23,909
Austria . . .	22	22	1,385	1,689	170	165	5,611	5,192	366	15,655
Belgium . . . ^{a)}	—	—	—	—	(1) 4,405 (1)	3,840 (1)	31,850 (1)	41,242	9,006	166,963
^{b)}	—	—	—	—	(1) 7,282 (1)	9,795 (1)	1,398 (1)	1,248	25,946	4,945
Denmark . . .	2	29	265	201	15	77	1,532	1,585	139	3,413
Finland . . .	0	0	212	104	20	44	1,010	754	86	1,929
France . . .	4,608	4,189	47,530	66,000	21,489	26,374	154,049	163,052	55,920	548,463
Gr. Britain and N. Ir.	28,466	34,489	103,247	95,423	108,100	126,971	278,453	262,124	333,774	779,872
Greece . . .	—	—	—	—	(1) 148 (1)	185 (1)	977 (1)	888	650	2,714
Italy . . . ^{a)}	119	51	10,199	9,308	798	36,903	23,947	2,024	95,004	—
^{b)}	42	174	776	1,257	875	1,272	4,381	5,752	2,685	13,109
Norway . . .	13	90	205	148	304	522	745	814	968	1,885
Netherlands . . . ^{a)}	209	146	1,878	858	807	999	3,843	2,820	2,112	10,532
^{b)}	40	37	644	459	137	247	2,535	2,447	527	6,257
Poland . . .	410	390	4,001	5,549	985	1,711	12,125	14,901	3,398	34,743
Sweden . . .	—	—	1,809	1,250	—	—	5,675	6,747	—	15,741
Switzerland . . .	18	2	2,646	1,786	24	15	8,259	6,788	—	19,178
Czechoslovakia . . .	86	95	2,363	3,364	580	1,118	11,686	11,289	2,273	36,149
Yugoslavia . . .	0	0	1,827	1,171	22	40	3,296	1,758	84	6,676
Canada . . .	29	456	1,181	4,124	829	3,067	3,827	4,136	2,101	9,778
United States . . .	79	353	13,768	26,464	617	1,023	51,044	108,851	1,113	203,631
Japan . . .	0	9	16,215	13,671	2	24	46,502	28,303	24	100,990
Totals . . .	147,998	161,997	236,751	273,662	659,369	636,128	776,636	798,135	2,718,870	2,421,632

a) = Wool, greasy; b) = Wool, scoured.

(1) (2) See notes page 181.

COUNTRIES	JANUARY		SEVEN MONTHS (July 1-Jan. 31)		TWELVE MONTHS (July 1-June 30)	COUNTRIES	JANUARY		SEVEN MONTHS (July 1-Jan. 31)		TWELVE MONTHS (July 1-June 30)
	1931	1930	1930-31	1929-30	1929-30		1931	1930	1930-31	1929-30	1929-30
Coffee. (Thousand lbs.)						Tea. (Thousand lbs.)					
EXPORTS.						EXPORTS.					
<i>Exporting Countries:</i>						<i>Exporting Countries:</i>					
Brazil . . . . .	...	...	(2) 843,818	(2) 863,730	1,995,631	Ceylon	20,344	20,937	131,085	139,344	251,286
India	1,565	1,601	6,803	3,671	31,698	India	26,162	31,081	293,132	316,746	369,752
Java and Madura . . .	...	...	(1) 23,836	(1) 39,816	55,704	Java and Madura . .	...	...	(1) 72,217	(1) 72,865	154,582
						Japan	763	584	15,895	20,106	24,835
<i>Importing Countries:</i>						<i>Importing Countries:</i>					
Germany	328	31	776	231	470	Belgium	2	2	20	13	26
Belgium	798	53	1,669	655	1,041	Irish Free State . .	9	11	95	112	196
France	2	0	55	15	22	France	2	4	22	42	57
Netherlands	1,166	1,836	10,809	11,852	21,268	Gr. Brit. and N. Ir.	7,066	6,493	51,412	58,209	95,771
Portugal	22	33	340	298	571	Netherlands	7	2	64	20	53
Switzerland	40	22	187	104	227	United States . . .	37	49	315	346	542
Canada	2	2	37	51	79	Syria and Lebanon .	...	...	(2) 9	(2) 22	29
United States	1,149	1,801	13,962	8,702	16,149	Algeria . . . . .	...	...	(1) 11	(1) 13	18
Ceylon	0	97	223	472	710	Union of S. Africa .	...	...	(2) 31	(2) 29	79
Syria and Lebanon . .	...	...	(2) 15	(2) 42	82	Australia	53	148	584	946	1,702
Australia	4	7	81	42	62	New Zealand . . . .	...	...	(3) 42	(3) 33	84
Totals	—	—	—	—	2,123,723	Totals	54,445	59,311	564,934	608,946	899,012
IMPORTS.						IMPORTS.					
<i>Importing Countries:</i>						<i>Importing Countries:</i>					
Germany	42,507	57,146	206,897	195,645	313,807	Germany	1,874	3,049	8,210	8,474	12,807
Austria	1,801	1,056	12,139	11,018	20,064	Austria	123	75	809	840	1,228
Belgium	11,870	10,168	64,538	52,666	94,962	Belgium	49	42	355	328	617
Bulgaria	106	183	807	1,153	1,735	Denmark	132	146	701	694	1,195
Denmark	5,770	4,665	34,619	31,711	58,519	Spain . . . . .	...	...	(2) 134	(2) 104	355
Spain . . . . .	...	...	(2) 23,962	(2) 18,927	52,066	Estonia . . . . .	...	...	13	18	90
Estonia	11	20	194	205	283	Irish Free State . .	1,863	1,651	14,947	14,085	23,310
Irish Free State . . .	51	33	231	214	483	Finland	15	31	148	159	278
Finland	450	3,424	28,947	21,810	38,614	France	309	249	1,942	1,911	3,305
France	31,200	35,146	227,266	222,802	385,018	Gr. Britain and N. Ireland	54,095	54,132	386,472	398,425	553,356
Gr. Britain and N. Ireland	3,322	3,250	21,394	21,054	36,099	Greece . . . . .	...	...	(1) 417	(1) 398	584
Greece . . . . .	...	...	(1) 6,400	(1) 5,981	12,452	Hungary	55	55	463	591	714
Hungary	483	672	4,138	4,815	8,128	Italy	20	24	183	198	337
Italy	9,039	9,535	57,184	60,420	102,592	Latvia	18	15	108	137	203
Latvia	31	22	227	207	331	Lithuania	9	9	99	104	174
Lithuania	33	49	300	265	428	Norway	26	29	220	225	375
Norway	2,926	2,205	20,728	16,667	34,335	Netherlands	2,855	2,485	17,646	17,051	20,366
Netherlands	9,147	8,889	61,022	59,031	98,986	Poland	397	379	2,722	2,606	4,434
Poland	1,312	1,305	10,205	10,487	17,668	Portugal	31	101	351	448	686
Portugal	571	1,151	6,183	5,604	9,978	Rumania . . . . .	...	...	(1) 578	(1) 694	1,116
Rumania . . . . .	...	...	(1) 5,401	(1) 5,093	9,905	Sweden	84	68	516	496	877
Sweden	7,826	8,049	57,422	58,321	99,162	Switzerland	112	126	948	902	1,567
Switzerland	1,828	2,138	15,585	16,510	31,017	Czechoslovakia . .	148	112	1,014	1,012	1,396
Czechoslovakia . . .	2,721	2,632	15,675	16,914	31,458	Yugoslavia	31	44	478	624	776
Yugoslavia	1,704	1,841	12,051	13,746	21,713	Canada	2,791	3,338	27,064	23,490	46,767
Canada	2,560	2,734	17,384	15,829	29,013	United States . . .	7,289	6,557	56,659	57,349	86,369
United States	144,452	136,775	900,355	855,418	1,562,080	Chile . . . . .	...	...	(2) 2,355	(2) 2,407	4,901
Chile . . . . .	...	...	(2) 4,319	(2) 4,947	12,597	Syria and Lebanon .	...	...	(2) 152	(2) 157	815
Ceylon	728	185	2,284	2,094	3,150	Algeria . . . . .	...	...	(1) 1,545	(1) 1,422	2,524
Japan	445	284	2,509	2,191	4,004	Egypt . . . . .	...	...	(1) 5,844	(1) 8,611	14,978
Syria and Lebanon . .	...	...	(2) 1,107	(2) 1,067	2,504	Tunis	412	287	1,969	1,931	3,144
Algeria . . . . .	...	...	(1) 14,890	(1) 13,869	26,853	Union of S. Africa .	...	...	(2) 5,298	(2) 4,453	11,091
Egypt . . . . .	...	...	(1) 5,935	(1) 12,256	27,661	Australia	4,081	4,279	30,644	31,599	50,784
Tunis	306	333	1,967	2,317	8,470	New Zealand . . . .	...	...	(3) 6,449	(3) 5,494	12,461
Un. of S. Africa . .	...	...	(2) 12,897	(2) 13,118	30,353	<i>Exporting Countries:</i>					
Australia	192	298	1,493	2,399	4,253	India	584	1,073	4,012	6,407	9,326
New Zealand . . . .	...	...	(3) 181	(3) 192	450	Java and Madura . .	...	...	(1) 7,381	(1) 8,746	14,917
<i>Exporting Countries:</i>						Totals	77,416	78,954	598,923	603,650	897,393
India	509	730	2,806	4,872	6,658						
Totals	363,961	394,918	1,861,942	1,782,435	3,193,733						

(1) (2) (3) See notes page 181.

COUNTRIES	JANUARY		FOUR MONTHS (Oct. 1-Jan. 31)		TWELVE MONTHS (Oct. 1- Sept. 30)	COUNTRIES	JANUARY		SIX MONTHS (August 1-Jan. 31)		TWELVE MONTHS (August 1- July 31)
	1931	1930	1930-31	1929-30	1929-30		1931	1930	1930-31	1929-30	1929-1930
Cacao. (Thousand lbs.).						Total Wheat and Flour (*). (Thousand centals).					
EXPORTS.						a) NET EXPORTS					
<i>Exporting Countries:</i>						<i>Exporting Countries:</i>					
Grenada			(1) 1,327	(1) 1,296	9,052	Bulgaria	11	(5)	933	(5)	(5)
Dominican Republ.	2,191	2,686	9,925	7,449	42,569	Spain		(2)	22	(5)	(5)
Brazil			(2) 25,843	(2) 40,625	162,486	Hungary	509	1,191	7,516	11,277	17,494
Ecuador			(1) 7,000	(1) 7,092	39,399	Lithuania	55	2	280	0	62
Trinidad	5,620	6,446	14,520	16,019	54,492	Poland	134	60	1,521	(5)	117
Venezuela			(1) 4,597	(1) 6,105	38,773	Rumania		(1)	6,601	(1)	236
Ceylon	1,116	1,003	3,699	3,373	8,443	Yugoslavia	42	842	2,851	11,588	13,719
Java and Madura			(1) 888	(1) 558	2,833	Canada	6,777	4,268	93,232	57,087	110,381
Cameroons	6,173	5,928	17,483	14,932	24,654	United States	2,352	7,501	38,367	51,705	83,223
Ivory Coast	4,408	4,766	11,228	12,002	49,377	Argentina	5,631	7,624	17,229	57,653	90,018
Gold Coast	58,110	77,636	147,582	256,242	507,606	Chile		(2)	478	(2)	95
Nigeria	29,871	20,743	66,024	57,140	110,449	British India	(5)	(5)	653	(5)	723
St. Thomas and Principe	2,654	2,295	14,212	19,917	33,912	Syria and Lebanon		(1)	9	(5)	(5)
Togoland	3,197	3,709	6,614	7,262	14,357	Algeria		(1)	4,760	(1)	1,030
						Tunis	2	150	1,241	2,412	3,468
						Australia	10,686	3,935	30,100	14,888	36,689
Totals	114,896	127,502	338,154	459,397	1,122,067	Totals	26,199	25,663	265,779	207,971	368,636
IMPORTS.						b) NET IMPORTS.					
<i>Importing Countries:</i>						<i>Importing Countries:</i>					
Germany	0	0	432	170	216	Germany	1,162	6,100	9,383	17,384	28,744
Belgium	84	7	97	86	304	Austria	672	719	3,697	5,203	11,407
France	0	37	75	37	37	Belgium	1,091	1,742	13,215	13,034	25,361
Netherlands	1,008	1,263	4,337	5,379	10,976	Bulgaria	(6)	82	(6)	830	855
Poland	0	0	0	11	13	Denmark	750	335	3,380	2,628	4,654
Czechoslovakia	0	0	13	20	20	Spain		(6)	(2)	1,876	2,063
United States	445	670	2,721	2,975	8,955	Estonia	29	64	348	381	705
Australia	18	24	37	106	276	Irish Free State	844	633	6,074	5,366	10,291
						Finland	108	53	1,850	2,004	3,320
						France	2,101	218	12,970	12,291	6,535
						Gr. Brit. and N. Ir.	8,704	7,921	73,401	67,984	122,913
						Greece		(1)	5,637	(1)	5,547
						Italy	3,377	1,093	23,459	5,249	25,402
						Latvia	60	106	620	778	1,490
						Norway	181	187	2,826	2,088	4,048
						Netherlands	2,573	888	12,220	8,733	18,116
						Poland	(6)	(6)	(6)	57	(6)
						Portugal	37	18	240	710	3,935
						Sweden	176	280	1,944	2,480	3,365
						Switzerland	1,043	739	6,367	5,073	9,590
						Czechoslovakia	79	604	7,679	4,198	7,921
						Ceylon	51	51	340	317	575
						Indochina	406	489	(6)	1,003	(6)
						Japan	1,349	840	3,424	3,567	8,356
						Java and Madura		(1)	511	(1)	531
						Syria and Lebanon		(6)	(2)	225	636
						Egypt		(1)	2,326	(1)	2,513
						Union of South Afr.		(2)	808	(2)	1,354
						New Zealand		(3)	106	(3)	60
Totals	110,253	132,716	539,870	464,239	1,065,613	Totals	24,799	23,180	192,800	173,710	322,436

(*) Flour reduced to grain on the basis of the coefficient: 1,000 centals of flour = 1,333.33 centals of grain.

a) Excess of exports over imports. — b) Excess of imports over exports.

(1) Data up to 31st December. — (2) Data up to 30th November. — (3) Data up to 31st October. — (4) Data up to 30th September. — (5) See Net Imports. — (6) See Net Exports.

STOCKS

STOCKS AND AVAILABLE SALEABLE SUPPLIES OF CEREALS AND POTATOES IN FARMERS' HANDS

IN GERMANY, ON FEBRUARY, 15.

PRODUCTS	% Stocks: total production				% Available saleable quantities: total production			
	15-II-31	15-I-31	15-II-30	15-II-29	15-II-31	15-I-31	15-II-30	15-II-29
Winter wheat	23.4	33.5	32.2	31.1	16.8	26.2	25.1	22.5
Spring wheat	50.5	61.1	52.9	52.1	37.3	47.1	41.1	42.9
Winter rye	35.2	44.2	41.1	36.0	17.0	22.9	22.1	18.0
Winter barley	16.7	21.6	26.6	19.2	2.0	2.4	5.6	1.6
Spring barley	26.3	36.6	39.1	33.5	10.5	17.7	21.4	17.9
Oats	54.1	64.0	57.2	55.1	13.3	17.0	20.4	16.7
Potatoes	40.9	49.1	43.4	47.1	11.9	14.5	12.3	16.5

Authority: Preisberichtsstelle beim Deutschen Landwirtschaftsrat.

STOCKS IN THE UNITED STATES IN FARMERS' HANDS, ON MARCH, 1ST.

PRODUCTS	% stocks: total production			Estimated stocks in absolute figures					
	1-III-31	1-III-30	1-III-29	1-III-31	1-III-30	1-III-29	1-III-31	1-III-30	1-III-29
				1000 centals			1000 bushels		
Wheat	18.8	16.0	16.5	90,000	77,852	90,838	160,000	129,754	151,396
Rye	20.8	13.0	13.2	5,648	3,062	3,205	10,085	5,468	5,724
Barley	26.0	23.8	27.2	40,711	34,637	46,640	84,815	72,160	97,167
Oats	33.1	32.2	34.6	148,480	126,819	159,147	464,000	396,310	497,335
Malze.	34.1	37.7	36.3	397,040	552,403	572,249	709,000	986,595	1,021,873

VISIBLE SUPPLY OF CEREALS IN CANADA AND THE UNITED STATES (1).

PRODUCTS AND COUNTRIES	28-II-31	31-I-31	27-XII-30	1-III-30	2-III-29	28-II-31	31-I-31	27-XII-30	1-III-30	2-III-29
	1000 centals					1000 bushels				
WHEAT:										
Canada	110,220	116,315	124,016	121,309	110,680	183,700	193,858	206,069	202,282	184,467
United States	124,800	121,522	119,242	99,104	78,020	208,100	202,537	198,736	166,174	130,084
TOTAL	235,020	237,837	243,258	220,473	188,700	391,800	396,395	405,429	367,456	314,551
RYE:										
United States	7,734	8,431	9,010	8,188	3,907	13,811	15,055	16,089	14,538	6,976
OATS:										
Canada	4,235	4,455	4,756	6,170	6,780	13,234	13,921	14,864	19,282	21,186
United States (2)	7,343	8,528	9,796	7,209	5,382	22,947	26,650	30,611	22,527	16,819
TOTAL	11,578	12,983	14,552	13,379	12,162	36,181	40,571	45,475	41,809	38,005
BARLEY:										
Canada	13,038	14,422	14,735	13,222	8,788	29,037	30,045	30,697	27,546	13,309
United States (2)	4,900	5,151	5,598	4,102	4,461	9,583	10,731	11,062	8,545	8,238
TOTAL	18,538	19,573	20,333	17,324	13,249	38,620	40,776	42,859	36,091	27,602
MAIZE:										
United States (2)	11,202	9,835	7,437	13,501	20,308	20,110	17,562	13,369	24,270	36,265

Authority: Bradstreet's (for rye: Grain, Seed and Oil Reporter).

(1) Grain stored at principal interior and seaboard points of accumulation and grain in transit by canals and lakes. — (2) East of Rocky Mountains.

GRAIN AND FLOUR STOCKS AT THE PORTS OF GREAT BRITAIN AND IRELAND (1).

PRODUCTS	1-III-31	1-II-31	1-I-31	1-III-30	1-II-29	1-III-31	1-II-31	1-I-31	1-III-30	1-II-29
	1000 centals					1000 bushels				
WHEAT :										
Grain	6,912	9,504	12,792	7,306	2,784	11,520	15,840	21,320	12,176	4,640
Flour as grain . . .	864	912	960	854	720	1,440	1,520	1,600	1,424	1,300
TOTAL	7,776	10,416	13,752	8,160	3,504	12,960	17,360	22,920	13,600	5,940
Maize.	2,448	2,856	2,064	2,472	3,672	4,371	5,100	3,686	4,414	6,587
Barley	1,360	1,840	1,880	1,200	1,400	2,833	3,883	3,917	2,500	2,917
Oats	1,104	1,312	1,008	640	576	3,450	4,100	3,150	2,000	1,800

Authority: *Broomhall's Corn Trade News*.
(1) Imported cereals.

STOCKS OF COTTON ON HAND IN THE UNITED STATES.

LOCATION	28-II-31	31-I-31	31-XII-30	28-II-30	28-II-29	28-II-31	31-I-31	31-XII-30	28-II-30	28-II-29
	1000 centals					1000 bales (counting round as half bales)				
In consuming establishments	7,407	7,723	8,083	8,822	8,451	1,548	1,614	1,660	1,812	1,746
In public storage and at compresses . . .	35,045	37,988	40,884	23,680	18,769	7,324	7,939	8,377	4,859	3,876
TOTAL	42,452	45,711	48,917	32,502	27,220	8,872	9,553	10,037	6,671	5,622

STOCKS OF COTTON IN EUROPE.

COUNTRIES, PORTS, DESCRIPTIONS	26-II-31	29-I-31	31-XII-30	27-II-30	28-II-29	26-II-31	29-I-31	31-XII-30	27-II-30	28-II-29
	1000 centals					1000 bales (1 bale = 478 lbs.)				
Great Britain (1):										
American	2,780	2,879	2,651	2,450	3,823	581	602	555	515	800
Argentine, Brazilian, etc.	204	188	210	679	173	43	39	44	142	36
Peruvian, etc.	344	397	426	345	231	72	83	89	72	48
East Indian, etc.	488	322	288	215	201	102	68	60	45	42
Egyptian, Sudanese	1,486	1,448	1,432	1,016	792	311	303	299	213	166
Other (2)	234	228	233	251	211	44	46	49	52	44
TOTAL	5,596	5,462	5,240	4,965	5,431	1,158	1,143	1,096	1,039	1,136
Bremen:										
American	2,458	2,712	2,679	2,426	2,906	514	568	560	508	608
Other	58	73	72	35	22	12	15	15	7	4
TOTAL	2,516	2,785	2,751	2,461	2,928	526	583	575	515	612
Le Havre:										
American	1,591	1,627	1,478	1,320	1,138	333	340	309	278	238
Other	164	169	168	108	80	34	36	35	23	17
TOTAL	1,755	1,796	1,646	1,437	1,218	367	376	344	301	255
Total Continent (3):										
American	4,665	4,936	4,838	4,382	4,580	976	1,033	1,012	917	958
Argentine, Brazilian, etc.	121	148	154	53	30	25	31	32	11	6
E. Indian, Australian, etc.	165	210	213	67	120	41	44	45	20	25
Egyptian	104	145	121	95	65	22	30	25	20	14
W. Indian, W. African, E. African, etc.	76	82	80	81	51	16	17	17	17	11
TOTAL	5,161	5,521	5,406	4,708	4,846	1,080	1,155	1,131	965	1,014

Authority: *Liverpool Cotton Ass.*

(1) Data for following day. - (2) Includes: W. Indian, etc.; E. African, etc.; W. African, and Australian. - (3) Includes Bremen, Havre, and other Continental ports.

STOCKS OF COTTON AT BOMBAY AND AT ALEXANDRIA.

PORTS	26-II-31	29-I-31	31-XII-30	27-II-30	28-II-29	26-II-31	29-I-31	31-XII-30	22-II-30	28-II-29
	1000 centals					1000 bales (1 bale = 478 lbs.)				
Bombay (1)	3,815	3,244	2,548	5,202	4,304	798	679	538	1,088	900
Alexandria	5,153	5,208	5,214	3,642	3,294	1,078	1,108	1,091	782	689

Authorities: *East Indian Cotton Ass.* and *Alexandria General Produce Ass.*

(1) Stocks held by exporters, dealers and mills.

IMPORT DUTIES ON CEREALS AND FLOUR

CHANGES AND CORRECTIONS

TO BE MADE IN THE DUTIES PUBLISHED ON PAGE 62 OF THE CROP REPORT OF JANUARY 1931.

COUNTRY	PRODUCT	Date when enforced	Original datum per metric quintal	Datum in Amer. cents per bushel or barrel
Germany	Rye	March, 6	R. M. 20.00	121.30
Spain (1)	Wheat (2)	before 1-1-31	pesetas 17.00	89.27
"	Rye	"	" 12.00	58.81
"	Barley	"	" 12.00	50.41
"	Oats	"	" 8.00	22.41
"	Maize	"	" 10.00	49.01
"	Wheat flour (2)	"	" 21.00	360.24
"	Rye flour	"	" 9.00	154.39
France	Barley	"	frs-fr. 15.00	12.85
Italy (3)	Wheat	March, 1	lires 6.600	86.65
"	Rye	"	" 16.50	22.06
"	Barley	"	" 14.70	16.80
"	Oats	"	" 11.95	9.10
"	Yellow maize	"	" 4.20	5.64
"	White maize	"	" 60.60	80.87
"	Wheat flour	"	" 87.00	406.56
"	Rye flour	"	" 23.90	111.50
Poland	Wheat	March, 10	zloties 25.00	76.46
"	Rye	"	" 17.00	48.52
"	Barley	"	" 17.00	41.59
"	Oats	"	" 17.00	27.73
"	Wheat flour	"	" 37.00	369.67
"	Rye flour	"	" 25.00	249.77
Portugal	Wheat	before 1-1-31	(4)	(4)
"	Rye	"	gold-esc. 2.00	2.25
"	Barley	"	" 2.00	1.93
"	Oats	"	" 2.00	1.29
"	Wheat flour	"	(4)	(4)

(1) 25 % of the duties are expressed in gold-pesetas and 75 % in paper-pesetas with a supplement fixed every 10 days. — (2) Embargo on imports; see note 8 on p. 62. — (3) The tariff is calculated in the present currency (1 lire = 5.463 ¢c.), generally by multiplying the old tariff expressed in terms of gold lire (1 lire = 19.30 ¢c.) by 3.67. — (4) Limited imports for certain purposes only, the quantities being fixed each year; duty is fixed yearly.

MONTHLY REVIEW OF PRICES (1)

PRODUCTS, MARKETS AND DESCRIPTIONS	March	March	Feb.	Feb.	Average (2)					Commercial Season	
	13.	6,	27,	20,	Feb.	March	March	1929-30	1928-29		
	1931	1931	1931	1931							
WHEAT.											
Winnipeg: No. 1 Manitoba (cents p. 60 lbs.) . .	57 ½	56 ¾	57 ¾	63 ¼	50 ¾	106 ¾	126 ¾	124 ¾	124		
Chicago: No. 2 Hard Winter (4) (cents p. 60 lbs.)	79	79	78 ½	78 ½	79	106 ¾	123 ¾	114 ¾	119 ¾		
Minneapolis: No. 1 Northern (cents p. 60 lbs.) .	75 ½	75 ½	75	75 ¾	75 ½	106 ¾	121	117 ½	115 ¾		
New York: No. 2 Hard Winter (4) (cents p. 60 lbs.)	n. q.	n. q.	n. q.	n. q.	n. q.	110 ¾	138	121 ¾	131 ¾		
Buenos Aires (a); Barletta (80 kg. p. hectol. — pesos paper per quintal)	5.75	5.80	5.95	6.25	6.10	10.44	9.92	10.65	9.98		
Karachi: Karachi white, 2 % barley, 1 ½ % dirt (rupees per 656 lbs.)	19-0-0	19-5-0	19-14-0	19-7-0	4)10-7-0	33-14-0	48-1-6	36-6-9	43-13-7		
Berlin: Home grown (Reichsmarks p. quintal)	29.40	29.20	28.80	27.40	27.42	24.12	22.31	25.33	21.83		
Hamburg, c. i. f. (Reichsmarks p. quintal):											
No. 3 Manitoba	(5) 12.40	(5) 11.01	...	(5) 12.93	...	18.65	22.54	21.30	21.59		
No. 2 Hardwinter	n. q.	n. q.	n. q.	n. q.	n. q.	18.14	22.12	19.49	20.98		
Barusso (79 kg. p. hectol.)	10.18	9.80	...	10.18	...	16.69	19.83	18.72	19.06		
Antwerp (Belgian francs p. quintal):											
Home grown	92	85	75	75	75	136	165	154 ¾	162 ½		
No. 2 Hard Winter, Gulf	126	122	114	120	116	158	...	171	...		
Paris: Home grown, 75-77 kg. (francs p. quintal).	170.75	178.25	178.25	178.75	178.75	133.20	160.55	139.40	155.35		
London: Home grown (shillings per 504 lbs.).	22/6	22/6	22/6	22/6	22/1	37/1	43/6	40/10	43/6		
London and Liverpool c. i. f., shipping current month (shillings p. 480 lbs.):											
South Russian (on sample)	20/6	20/6	20/9	22/-	22/1	n. q.	n. q.	n. q.	n. q.		
No. 3 Manitoba	23/6	23/1 ½	24/-	25/6	n. 24/5	39/4	47/2	45/2	45/6		
No. 2 Hard Winter	24/6	n. q.	n. q.	6)28/3	n. q.	38/7	n. q.	41/5	43/3		
White Pacific	n. q.	n. q.	24/-	24/-	24/7	39/-	46.1	42/3	46/-		
Rosafe (63 ½ lbs.), afloat	(7) 20/9	(7) 20/-	21/-	21/10 ½	21/-	37/1	42/7	40/3	42/3		
Choice White Karachi	n. q.	n. q.	n. q.	n. q.	n. q.	40/-	n. q.	42/2	n. q.		
Australian	21/3	21/-	21/7 ½	22/3	21/10	39/4	46/6	43/6	45/11		
Milan (b): Home grown, soft (liras p. quintal)	105.50	105.50	107.50	108.50	107.85	130.75	136.90	131.80	131.40		
Genoa c. i. f. (shillings p. metric ton): La Plata .	n. 98/-	n. 96/-	n. 98/6	n. 100/-	96/4	164/-	198/6	184/6	192/10		
RYE.											
Minneapolis: No. 2 (cents per 56 lbs.)	35 ½	36 ½	35 ½	38	36 ¾	65 ¾	105	80 ½	90		
Berlin: Home grown (Reichsmarks per quintal) .	18.60	16.90	18.40	15.60	15.79	14.65	20.65	17.04	20.47		
Hamburg c. i. f.: La Plata, 74-75 kg. (R. M. p. 100 kg.)	n. q.	n. q.	n. q.	n. q.	n. q.	(8) 13.33	20.35	14.57	19.72		
Groningen (c): Home grown (florins per quintal)	3.85	3.80	3.80	3.80	3.82	5.10	9.97	6.33	9.74		
BARLEY.											
Winnipeg: No. 4 Western (cents p. 48 lbs.) . .	24	21 ¾	20 ¾	20 ¾	19 ¾	41 ¾	69 ¾	51 ¾	67 ¾		
Chicago: Feeding (cents per 48 lbs.)	39	37	40	36	41	56 ¾	57	57 ¾	56 ¾		
Berlin: Home grown, fodder (Reichsmarks per quintal)	21.30	20.30	20.00	19.70	19.77	14.70	19.70	17.40	19.78		
Antwerp: Danube (francs per quintal)	70	69 ½	68	66	66	84	168	107 ½	154 ½		
London: English malting (shillings p. 448 pounds).	40/-	40/-	40/-	37/6	38/7	37/-	45/-	39/-	47/8		
London and Liverpool, c. i. f., parcels (shillings per 400 lbs.):											
Danubian 3 %	15-6	15/3	(9) 14/6	15/-	14/9	18/8	n. q.	22/3	32/6		
Russian (Azoff-Black sea)	n. q.	n. q.	n. q.	n. q.	13/1	18/1	n. q.	18/11	n. q.		
Canadian Western, No. 4	(10) 16/-	(10) 15/-	(10) 14/6	(10) 14/9	(10) 14/3	22/6	32/5	n. 25/10	29/4		
Californian malting (shillings p. 448 lbs.) . .	23/6	24/-	(9) 24/3	(9) 25/-	(9) 24/10	30/3	40/2	32/6	39/9		
Moroccan	n. q.	n. q.	n. q.	n. q.	n. q.	n. q.	30/10	n. 24/2	29/8		
Groningen (c): Home grown winter (fl. p. quintal)	4.70	4.45	4.35	4.50	4.50	5.87	9.95	7.55	9.07		

(a) Thursday prices. — (b) Saturday prices. — (c) Prices of preceding Tuesday.

(1) All quotations are, unless otherwise stated, for spots. — (2) The monthly averages are based on Friday quotations, the annual averages on the monthly. — (3) Quoted formerly as No. 2 Winter. — (4) February, 13; 19-1-0. — (5) No. 2 Manitoba. — (6) N. 1 Hard Winter. — (7) 63 lbs. per bushel. — (8) 73 kg. per hectolitre. — (9) Shipping March-April. — (10) No. 3 Western.

PRODUCTS, MARKETS AND DESCRIPTION	March	March	Feb.	Feb.	Average (1)					
	13, 1931	6, 1931	27, 1931	20, 1931	Feb. 1931	March 1930	March 1929	Commercial Season		
								1929-30	1928-29	
OATS.										
Winnipeg: No. 2 White (cents per 34 lbs.) . . .	28 1/4	28 3/4	28 1/2	29 1/4	27 1/4	55 1/2	64 1/2	58 1/2	58 1/4	
Chicago: No. 2 White (cents per 32 lbs.) . . .	32 1/4	31 1/4	33	31 1/4	32 1/4	44	50 1/4	44 1/4	47 1/4	
Buenos Aires (a): Current quality (pesos paper per quintal)	3.25	3.15	3.25	3.35	3.26	4.31	7.69	5.30	7.71	
Berlin: Home grown (Reichsmarks per quintal) .	15.95	15.15	15.00	14.15	14.35	12.91	20.20	15.62	19.98	
Paris: Home grown, black and other (francs per quintal)	78.50	78.25	79.00	80.75	79.75	69.05	133.80	81.15	127.85	
London: Home grown white (shillings per 336 lbs.)	17/6	17/6	17/6	17/6	17/6	18/-	29/-	21/-	28/3	
London and Liverpool c. i. f., parcels (shillings p. 320 lbs.):										
Danubian (39-40 lbs.)	n. q.	n. q.	n. q.	n. q.	n. q.	n. q.	n. q.	(2)n. 16/4	n. q.	
Plate (f. a. q.)	10/4 1/2	9/6	9/4 1/2	9/6	9/4	12/8	24/4	16/1	23/0	
White clipped American	n. q.	n. q.	n. q.	n. q.	n. q.	n. q.	24/7	n. q.	24/2	
Chilian Tawny	11/-	10/3	10/6	10/-	10/7	13/7	24/10	17/3	24/2	
Milan (b): spot (liras per quintal):										
Home grown	73.50	73.50	73.50	73.50	73.50	78.25	109.50	80.75	103.30	
Foreign imported	54.50	56.00	57.50	57.50	57.00	66.25	95.80	74.25	98.90	
MAIZE.										
Braila: Danube (lei per quintal)	245	217	210	205	203	280	774	309	687	
Chicago: No. 2 Mixed American (cents per 56 lbs.)	62 1/4	60 1/2	62 1/4	59 1/2	61 1/4	80	95 1/4	85 1/4	94 1/4	
Buenos Aires (a): Yellow Plate (pesos paper per quintal)	4.30	3.80	3.90	3.80	3.81	6.10	8.54	6.17	8.35	
Antwerp, spot (Belgian francs per quintal):										
Bessarabian	70	69	68 1/2	67	65 1/4	n. q.	171 1/2	n. 97 1/4	n. q.	
Yellow Plate	70	68	68	66	64	100 1/2	170 1/2	109 1/4	165 1/4	
London and Liverpool, parcels, c. i. f. (shillings per 480 lbs.):										
Danube	n. q.	(3)18/3	(3)18/7 1/2	n. q.	n. q.	23/2	n. q.	24/11	n. q.	
Yellow Plate	18/6	16/0	16/3	16/3	15/4	24/7	41/8	25/3	38/3	
No. 2 White African	n. q.	n. q.	n. q.	n. q.	n. q.	25/10	39/7	29/-	38/8	
Milan (b): Home grown (liras per quintal) . . .	40.50	40.50	40.50	40.50	40.50	70.50	108.90	71.35	97.00	
RICE (CLEANED).										
								1930	1929	
Milan (b): Maratelli (lire per quintal)	110.00	110.00	110.00	110.00	110.00	167.60	195.00	152.15	195.70	
Rangoon: No. 2 Burma (rupees per 7500 lbs.) .	245	230	230	230	236	393 1/4	435	393 1/4	462 1/4	
Salgon (Indochinese piastres (4) p. quintal):										
No. 1 Round white (25 % broken)	7.37	7.08	7.00	7.08	7.10	11.78	10.05	...	11.58	
No. 2 Japan (40 % broken)	6.51	6.28	6.28	6.43	6.42	11.37	9.57	...	11.08	
London (a): c. i. f. (shillings per 112 lbs.):										
Spanish Belloch No. 3 oiled	12/4 1/2	12/1 1/2	11/10 1/2	11/6	11/7	15/-	19/1	14/1	17/11	
Italian good No. 6 oiled	13/-	12/7 1/2	12/7 1/2	12/3	12/3	15/11	19/7	14/11	18/9	
American Blue Rose	18/6	18/10 1/2	18/10 1/2	18/10 1/2	18/10 1/2	23/-	21/5	21/9	21/10	
Burma, No. 2	7/9	7/4 1/2	7/4 1/2	7/3	7/6	11/-	12/11	10/11	13/2	
Saigon, No. 1	8/1 1/2	7/10 1/2	7/10 1/2	7/10 1/2	7/10	11/7	12/11	11/6	13/8	
Siam, Garden, No. 1	9/6	9/3	9/1 1/2	9/1 1/2	9/5	13/11	15/1	14/-	15/1	
Tokio: Various qualities (yens per koku) . . .	17.80	17.80	17.70	17.70	17.70	n. 27.33	28.96	25.57	29.06	
LINSEED.										
Buenos Aires (a): Current quality (pesos paper per quintal)	11.05	11.15	11.35	11.20	10.96	19.06	15.39	17.19	18.20	
Antwerp: Plate (Belgian francs p. quintal) . .	174	186	170	160	164	395	277 1/2	284 1/4	318 1/4	
Hull, c. i. f.: Plate (p. sterling p. l. ton) . . .	9-11-3	9-3-9	9-13-9	9-11-3	9-1-3	16-0-0	15-16-1	15-0-5	18-5-0	
London, c. i. f.: Bombay bold (p. st. per long ton)	(5)12-17-0	n. q.	n. q.	n. q.	n. q.	18-18-9	19-7-2	17-14-4	20-16-1	
Duluth: No. 1, Northern (cents p. 56 lbs.) . .	(6) 160 1/4	(6) 157	(6) 158	(6) 158 1/2	(6) 156	291 1/2	243 1/4	236	273 1/4	

(a) Thursday prices. — (b) Saturday prices.

(1) The monthly averages are based on Friday quotations, the annual averages on the monthly. — (2) Weight not indicated. —

(3) Maize Galatz-Fox. — (4) Actual rate of change: 1 piastre = 38 1/4 %c. — (5) New harvest, April-May delivery. — (6) May delivery. — (7) February, 13: 133.

PRODUCTS, MARKETS AND DESCRIPTION	Average (1)							
	March	March	Feb.	Feb.				
	13,	6,	27,	20,				
	1931	1931	1931	1931	Feb.	March	March	Commercial
					1931	1930	1929	Season
								1929-30 1928-29
COTTONSRED.								
Alexandria: Sakellaridis (piastres per ardeb)	61.2	60.3	64.3	n. q.	57.2	67.7	97.7	67.9 95.4
Hull: Sakellaridis (p. sterl. p. long ton)	6-18-0	6-6-3	6-17-6	5-18-0	6-1-3	7-1-7	9-12-0	6-18-2 9-12-2
COTTON.								
New Orleans: Middling (cents per lb.)	10.35	10.75	10.81	10.69	10.64	14.87	20.01	16.17 18.98
New York: Middling (cents per lb.)	10.75	11.05	11.15	11.00	10.97	15.17	21.23	16.60 19.00
Bombay: M. g. Broach f. g. (rupees per 784 lbs.)	205	214	218	218	212	255	368 1/4	283 1/2 346 1/4
Alexandria (a) (talaris per kantar):								
Sakellaridis f. g. f.	10.72	10.02	10.07	17 1/4	17 1/4	26 1/4	37 1/4	28 1/4 35 1/4
Ashmouni (Upper Egypt) f. g. f.	12.35	13.50	13.95	13	12 1/4	19 1/4	23 1/4	19 1/4 22 1/4
Bremen: Middling (U. S. cents per lb.) . . . . .	...	...	12.40	12.33	12.07	16.60	22.18	18.27 21.10
M. g. Broach fully good (pence per lb.) . . . . .	...	...	n. 5.25	n. 5.20	n. 5.14	n. 5.89	n. 8.62	n. 6.83 n. 8.27
Le Havre: Middling, Gulf (francs pr 50 kilogram.)	375	375	373	377	367	500	650	545 624
Liverpool (pence per lb.):								
Middling fair	n. 7.17	n. 7.29	n. 7.38	n. 7.24	n. 7.15	n. 9.71	n. 12.26	n. 10.39 n. 11.60
Middling	5.97	6.09	6.18	6.04	5.95	8.30	11.01	9.09 10.53
São Paulo good fair	6.27	6.39	6.48	6.34	6.25	8.30	11.36	9.02 n. 10.91
M. g. Broach fully good	n. 4.57	n. 4.68	n. 4.78	n. 4.71	n. 4.59	n. 5.92	n. 9.25	n. 6.80 n. 8.08
Sakellaridis fully good fair	9.55	9.85	10.35	9.70	9.60	13.82	19.04	14.52 18.17
BUTTER.								
								1930 1929
Copenhagen (a) (Kr. p. 100 kg.)	232	232	234	246	243	261	296	245 303
Maastricht, auction (b): Dutch (guldens p. 50 kg.,	1.61	1.60	1.61	1.75	1.68	1.81	1.98	1.70 2.09
Hamburg, auction (b): Schleswig-Holstein butter								
with quality mark (R. M. per 50 kg.)	146.54	151.04	152.22	158.86	154.62	152.67	176.40	146.67 178.03
Kempten (b): Allgäu butter (Pfennige p. half kg.)	127	127	127	127	126	135 1/2	158	128 159
London (c) (shillings p. cwt.):								
British blended	140/-	144/8	144/8	144/8	141/2	172/8	196/-	158/8 196/-
Danish	146/-	150/-	154/-	162/-	151/6	166/-	187/-	153/6 180/6
Irish creamery salted	n. q.	n. q.	n. q.	n. q.	n. q.	n. q.	n. q.	134/10 170/4
Dutch	144/-	150/-	152/-	156/-	149/6	168/-	187/6	151/11 182/4
Argentine	127/-	180/-	132/-	127/-	124/-	148/-	172/0	135/10 174/1
Siberian	n. q.	n. q.	n. q.	n. q.	n. q.	143/-	n. q.	... 167/2
Australian salted	126/-	126/-	126/-	126/-	122/3	142/6	172/-	135/9 176/-
New Zealand salted	128/-	128/-	129/-	129/-	125/-	146/6	172/6	137/8 178/9
CHEESE.								
Milan (lire per quintal):								
Parmigiano-Reggiano, 1st quality of last year's								
production	1,112	1,112	1,112	1,112	1,106	1,125	1,047	1,160 1,074
Green Gorgonzola, mature, choice	660	660	660	660	660	719	900	671 829
Rome: Roman pecorino (lire p. quintal)	1,050	1,050	1,050	1,050	1,081	1,270	1,671	1,207 1,546
Alkmaar: Edam 40 + 40% butterfat, with the								
country's cheesemark, factory cheese, small:								
florins, p. 50 kg.)	35.50	35.50	35.50	34.75	34.19	43.75	46.00	40.88 47.10
Gouda (5): Gouda 45 + (whole milk cheese, with								
the country's cheesemark, home made; florins,								
p. 50 kg.) . . . . .	...	40.50	40.50	40.00	40.00	48.00	53.50	45.56 52.45
Kempten (C): Pfennige per half kg.):								
Softcheese, green (20 % butterfat)	23 1/2	23 1/2	23 1/2	23 1/2	23 1/2	24 1/2	26 1/2	27 35
Emmenthal from the Allgäu (whole milk cheese)								
1st quality	98 1/2	98 1/2	98 1/2	98 1/2	98 1/2	(3)101	(3)108 1/2	(3) 97 (3)107
London (c) (shillings per cwt.):								
English Cheddar	102/-	102/-	100/-	100/-	97/-	116/-	137/6	103/4 121/9
Canadian	81/6	82/-	84/-	83/-	82/6	103/9	114/-	98/11 107/8
New Zealand	82/-	82/-	61/-	61/-	59/3	88/1	93/3	82/2 95/5
Liverpool (c): Engl. Cheshire, ungraded (sh. p. cwt.)	110/-	109/8	105/-	95/8	98/-	130/8	131/7	96/5 111/0

(a) Thursday prices. - (b) Wednesday prices. - (c) Average prices for weeks ending on preceding Wednesday.

(1) The monthly averages are based on Friday quotations, the annual averages on the monthly. - (2) Indicated formerly as: -legrown. - (3) Average price for all qualities.

THE PRICES OF AGRICULTURAL PRODUCTS IN FEBRUARY, 1931

In the following pages the index-numbers of prices of agricultural products and other price indices of interest to the farmer are given as published in the different countries. The indices collected together have been obtained according to different methods and criteria in the countries. A detailed account of the items included in each series and the system of construction of the index-numbers may be found in the volume published especially for this purpose by the Institute, entitled « Index-numbers of prices of agricultural products and other price indices of interest to the farmer ». We refer the reader to this volume for an exact interpretation of the significance of the different series of data.

Owing to the substantial divergence which often exists in the value and significance of the indices available, much care is advisable in their utilization from an international point of view. For this reason it has been considered opportune to reproduce all the data in their original form only; without attempting to formally unite them. The latter process, by a comparison of often heterogeneous data, might easily lead to the drawing of erroneous relations and conclusions.

But in addition to the original data, and subject to the above comments, a summary table is given below.

Countries	Percentage variations in the index-numbers for February, 1931			
	compared with those for January, 1931		compared with those for February, 1930	
	Index-numbers of prices of agricultural products	General index-numbers of prices	Index-numbers of prices of agricultural products	General index-numbers of prices
Germany	-- 0.7	-- 1.0	--- 8.7	--- 11.8
England and Wales	-- 3.1	-- 0.2	--- 12.5	--- 18.4
Argentina	+ 2.8	---	--- 32.0	---
Canada	-- 0.3	-- 0.9	--- 37.7	--- 19.1
Estonia	+ 1.4	---	--- 20.9	---
United States	-- 4.3	---	--- 31.3	---
Finland	-- 4.6	-- 2.0	--- 28.5	--- 18.0
Hungary	0.0	0.0	--- 15.9	--- 7.5
Italy	+ 1.3	+ 1.1	--- 15.0	--- 11.5
New Zealand	-- 1.2	-- 1.1	--- 23.2	--- 19.5
Netherlands	+ 0.5	---	--- 27.0	---
Poland	+ 1.4	...	--- 14.3	...
Yugoslavia	c) + 2.5 d) -- 4.8	--- 1.2	c) -- 27.0 d) -- 19.6	--- 18.8

a) "Bureau of Agricultural Economics". — b) "Bureau of Labor". — c) Products of the soil. — d) Animal products.

INDEX-NUMBERS OF PRICES OF AGRICULTURAL PRODUCTS AND OF COMMODITIES BOUGHT BY THE FARMER *

COUNTRIES AND CLASSIFICATION	Febr.	Jan.	Dec.	Nov.	Oct.	Sept.	Febr.	Febr.	Year	
	1931	1931	1930	1930	1930	1930	1930	1929	1930 (1)	1929
GERMANY (Statistisches Reichsamt) 1913 = 100.										
Foodstuffs of vegetable origin	114.1	111.6	111.3	110.9	108.8	116.7	111.7	131.0	115.3	126.3
Livestock	90.6	97.5	104.4	108.2	104.7	108.2	122.9	119.0	112.4	126.6
Livestock products	119.9	119.4	126.6	131.3	127.5	124.6	128.5	150.5	121.7	142.1
Feeding stuffs	93.0	90.9	91.1	87.9	87.2	96.8	88.4	139.7	93.2	125.9
Total agricultural products	105.9	103.7	110.4	112.0	109.3	113.5	116.0	132.9	113.1	130.2
Fertilizers	83.1	82.3	80.5	80.4	80.4	80.0	86.0	87.4	82.4	84.5
Agricultural dead stock	133.3	134.0	136.0	137.4	138.6	139.1	140.8	141.4	139.4	141.3
General index-number	114.0	115.2	117.8	120.1	120.2	122.8	120.3	130.3	124.6	137.2
ENGLAND AND WALES (Ministry of Agriculture) Average of corresponding months 1911-13 = 100.										
Agricultural products	126	130	126	129	129	142	144	144	134	144
Feeding stuffs	77	78	81	78	82	90	105	151	95	139
Fertilizers	100	102	101	100	99	99	102	100	101	100
General index-number (2)	100.6	100.8	102.2	104.2	105.4	106.8	123.3	141.3	113.1	135.9
ARGENTINA (Banco de la Nación argentina) 1926 = 100.										
Cereals and linseed	54.5	53.6	56.0	59.8	70.7	77.9	93.2	102.0	82.3	100.4
Meat	94.6	91.0	90.5	99.3	109.6	114.4	110.5	110.1	110.9	113.6
Hides and skins	70.0	69.1	65.6	70.4	72.3	70.6	74.0	104.0	71.6	95.0
Wool	55.2	50.6	51.8	57.3	62.2	64.9	70.0	119.7	67.4	108.5
Dairy products	72.9	68.7	68.7	72.6	78.5	80.3	95.9	107.8	82.4	105.9
Forest products	108.7	108.7	108.7	108.7	108.7	107.7	106.8	109.7	107.9	111.5
Total agricultural products	63.4	61.7	63.2	67.0	77.1	82.8	93.2	105.0	85.5	102.6
CANADA (Internal Trade Branch of the Dominion Bureau of Statistics) 1926 = 100.										
Field products (grain, etc.)	45.2	42.9	43.6	48.7	54.7	59.3	85.5	90.7	70.4	93.8
Animals and animal products	87.0	91.3	93.6	96.6	98.9	93.6	117.8	110.5	103.1	112.5
Total Canadian farm products	60.8	61.0	62.3	66.6	71.2	72.1	97.6	98.1	82.7	100.8
Fertilizers	89.4	88.9	89.2	89.3	80.2	91.5	81.6	96.5	88.6	92.6
General index-number	76.0	76.7	77.8	79.8	81.4	82.5	94.0	95.0	86.9	95.6
ESTONIA (Central Bureau of Statistics) 1922 = 100.										
Commodities imported	83	86	83	88	90	74	83	100.7	83	94.6
Commodities exported	66	64	63	72	72	85	96	123.0	88	112.8
Agricultural products imported and exported	72	71	70	74	75	78	91	114.2	84	105.7

* For an explanation of the method of calculation of the index-numbers, reference should be made to the Institute's publication "Index-numbers of Prices of Agricultural Products and other Price-indices of interest to the Farmer" (Rome, 1930).

(1) Most data for 1930 are provisional. — (2) Calculated by the "Statist", reduced to base-year 1913 = 100.

COUNTRIES AND CLASSIFICATION	Febr.	Jan.	Dec.	Nov.	Oct.	Sept.	Febr.	Febr.	Year	
	1931	1931	1930	1930	1930	1930	1930	1929	1930 (1)	1929
UNITED STATES (Bureau of Agricultural Economics) Average 1909-10 to 1913-14 = 100.										
Cereals	75	77	80	80	92	100	115	123	100	121
Fruits and vegetables	109	108	108	114	127	148	168	111	158	136
Meat animals	106	112	112	118	123	128	150	150	134	156
Dairy products	101	107	117	124	125	123	129	144	123	140
Poultry and poultry products	79	110	127	146	129	125	154	158	126	159
Cotton and cottonseed	76	72	73	80	76	83	121	149	102	145
Total agricultural products	90	94	97	103	106	111	131	136	117	138
Commodities purchased by farmers (2)	139	149	149	149	149	149	153	156	151	155
Agricultural wages (2)	—	—	129	—	—	150	(3) 159	(3) 162	...	170
UNITED STATES (Bureau of Labor) 1926 = 100.										
Grains	60.4	62.4	61.0	64.0	72.1	77.0	80.0	102.0	78.6	97.4
Livestock and poultry	69.6	75.2	70.3	77.7	82.4	88.0	101.3	101.8	89.2	106.1
Other farm products	73.7	76.0	78.1	85.4	86.3	80.4	98.9	109.2	91.3	106.6
Total farm products	70.1	73.5	75.2	79.3	82.6	85.3	98.0	105.4	89.5	104.9
Agricultural implements	94.7	94.7	94.9	94.9	94.9	94.9	96.1	98.8	95.1	97.9
Fertilizer materials	81.1	81.4	81.4	82.1	83.6	83.1	89.5	94.7	85.4	92.1
Mixed fertilizers	80.1	90.4	90.6	91.1	92.9	92.5	96.2	97.1	93.6	97.2
Cattle feed	71.6	75.0	78.2	83.0	89.6	93.6	107.5	129.3	99.8	121.6
Non-agricultural commodities	77.1	78.2	79.4	80.9	82.8	84.0	90.6	94.3	85.9	94.4
General index-number	75.5	77.0	78.4	80.4	82.6	84.2	92.1	96.7	86.4	96.5
FINLAND (Central Bureau of Statistics) 1926 = 100.										
Cereals	74	75	72	71	68	69	81	105	76	98
Potatoes	68	68	59	51	51	54	101	169	76	148
Fodder	62	59	53	58	57	60	64	76	62	69
Meat	73	74	72	70	77	86	96	111	88	103
Dairy products	75	73	74	79	83	88	91	105	84	108
Total agricultural products	74	74	73	74	75	78	88	108	82	100
General index-number	86	86	86	87	86	88	93	100	90	98
HUNGARY (Central Bureau of Statistics) 1913 = 100.										
Agricultural and livestock products	80	79	78	80	83	80	93	137	—	—
General index-number	92	91	90	92	94	92	104	136	—	—
ITALY (Consiglio Provinciale dell'Economia di Milano) 1913 = 100.										
National agricultural products	343.75	347.90	356.88	373.77	390.97	409.98	447.66	547.40	413.30	508.76
General index-number	357.92	362.86	368.63	370.03	386.60	398.30	444.54	498.24	411.04	480.00
NEW ZEALAND (Census and Statistics Office) Average 1909-13 = 100.										
Dairy produce	102.0	98.8	102.6	104.8	110.2	113.7	135.9	155.5	190.0	145.7
Meat	142.4	147.0	160.0	146.5	143.7	153.3	173.2	186.1	161.6	170.9
Wool	55.7	62.3	59.3	79.8	86.2	95.5	103.1	122.8	95.7	188.6
Hides, skins, and tallow	196.0	93.2	122.6	98.9	112.1	104.2	163.7	191.0	142.1	178.9
Miscellaneous	122.9	113.8	129.8	126.0	114.7	130.9	135.0	156.2	129.0	146.7
Total agricultural products	97.2	96.7	101.8	107.4	114.3	117.3	133.2	170.0	124.8	161.3

(1) Most data for 1930 are provisional. — (2) 1910-14 = 100. — (3) January.

COUNTRIES AND CLASSIFICATION	Feb.	January	Dec.	Nov.	Oct.	Sept.	Feb.	Feb.	Year	
	1931	1931	1930	1930	1930	1930	1930	1929	1930 (1)	1929
NORWAY (Kgl. Selskap for Norges Vel.) Average 1909-14 = 100.										
Cereals	104	102	99	101	109	118	138	167	(2) 155	(2) 182
Potatoes	181	180	158	155	172	200	119	140	(2) 120	(2) 231
Wool	84	89	98	102	98	96	140	158	(2) 141	(2) 157
Other meat	182	184	193	192	193	203	208	182	(2) 199	(2) 183
Eggs	101	107	146	179	151	124	124	140	(2) 135	(2) 150
Dairy products	138	139	150	158	158	157	156	165	(2) 161	(2) 176
Concentrated feeding stuffs	103	107	111	115	118	122	133	158	(2) 148	(2) 167
Faize	81	89	93	97	107	114	124	164	(2) 148	(2) 164
Fertilizers	96	96	95	101	106	99	106	101	(2) 103	(2) 104
NETHERLANDS (Directie van den Landbouw) Average 1924-25 to 1928-29 = 100.										
Products of the soil	66	62	59	61	68	73	56	82	(3) 68	(3) 87
Animal products	74	74	74	77	80	83	93	98	(3) 95	(3) 98
Total agricultural products	72	71	71	73	77	81	84	94	(3) 88	(3) 95
Agricultural wages	100	100	100	100	100	100	100	100	(3) 100	(3) 100
General index-number (4) . . . . .	...	71.0	72.4	74.4	75.1	75.8	85.3	98.8	79.2	96.1
POLAND (Central Bureau of Statistics) 1927 = 100.										
Products of the soil . . . . .	...	44.3	46.4	47.6	45.8	49.9	51.8	84.4	52.2	73.1
Products of agricultural industry . . . . .	...	59.3	63.6	65.4	63.1	64.9	67.9	84.9	69.9	80.9
Total products of plant origin . . . . .	...	51.5	54.6	56.1	54.0	57.1	58.4	84.7	60.6	76.9
Animals . . . . .	...	54.9	68.6	72.7	77.8	79.9	89.3	89.9	82.3	88.4
Dairy products . . . . .	...	77.5	88.9	97.0	88.2	79.0	82.4	124.1	81.3	102.9
Total products of animal origin . . . . .	...	65.1	78.2	84.0	82.4	79.6	86.2	109.4	81.9	100.2
Total agricultural products . . . . .	...	56.5	63.2	66.2	64.3	65.5	69.3	92.3	68.5	85.7
Fertilizers . . . . .	...	124.7	124.7	124.7	126.2	126.2	130.6	118.2	121.7	126.5
Industrial products . . . . .	...	86.0	87.8	88.9	90.6	91.8	98.2	103.9	94.2	103.3
General index-number . . . . .	...	72.3	76.6	78.6	78.4	79.6	84.9	98.8	82.4	95.7
YUGOSLAVIA (National Bank of the Kingdom of Yugoslavia) 1926 = 100.										
Products of the soil	73.5	71.7	72.5	71.4	77.3	78.0	109.7	133.1	89.3	118.6
Animal products	78.1	82.0	86.4	95.1	93.3	95.6	97.1	109.0	96.3	107.2
Industrial products	72.1	72.8	75.2	74.8	75.4	78.2	85.9	95.8	81.8	92.6
General index-number	74.8	75.7	78.0	79.2	80.9	82.8	92.1	105.5	86.6	100.6

(1) Most data for 1930 are provisional. — (2) Agricultural year April 1-March 31. — (3) Agricultural year July 1-June 30. —
 (4) Calculated by the Central Statistical Bureau of the Netherlands, reduced to the base 1925-1929 = 100.

RATES OF FREIGHT

(Rates for full cargoes).

VOYAGES	March	March	Febr.	Febr.	Average			Commercial	
	13,	6,	27,	20,	Febr.,	March	March	Season	
	1931	1931	1931	1931	1931	1930	1929		
								1929-30	1928-29
SHIPMENTS OF WHEAT AND MAIZE.									
Danube to Antwerp/Hamburg	(shill. p. 14/-	14/-	14/-	14/3	n.14/1½	13/3	n. q.	15/8	n. 14/0
Black Sea to Antwerp/Hamburg	(2240 lbs.) 10/0	10/6	10/0	11/-	11/-	n. q.	n. q.	n. q.	n. q.
St. John to Liverpool (1)	1/6	1/6	1/6	1/6	1/6	1/4	1/10	1/5	3/1
Montreal to United Kingdom	(shill. per n. q.	n. q.	n. q.	n. q.	n. q.	n. q.	n. q.	1/10	2/10
Gulf to United Kingdom	(480 lbs.) (1) 2/-	(1) 2/-	(1) 2/-	(1) 1/0	(1) 1/0½	2/3	3/-	2/6	3/4
New York to Liverpool (1)	1/6	1/6	1/6	1/6	1/6	1/4	1/7	1/6	2/3
Northern Range to U.K. and Continent	n. 2/-	n. 2/-	2/3	2/2	2/-	1/0	3/-	1/9	2/11
North Pacific to United Kingdom (shill. per 2240 lbs.)	22/6	n. q.	n.22/6	n.22/6	n.22/6	18/9	30/4	22/7	30/7
Vancouver to Yokohama (1) (dollars p. sh. ton)	2.75	2.75	2.75	2.75	2.75	2.50	3.50	2.78	3.8
La Plata Down River (2) to U. K./Continent	17/-	18/6	19/-	18/6	18/-	9/10	24/-	12/8	22/1
La Plata Up River (3) to U. K./Cont. (shill. per 2240 lbs)	19/-	19/0	20/3	19/6	19/7½	11/4	25/5	14/4	23/7
Karachi to U. K./Continent (4)	20/-	19/10	18/8	18/8	19/0	n. q.	19/5	n. 15/4	22/-
Western Australia to U.K./Continent	20/0	20/0	30/-	30/-	30/-	20/11	34/6	25/7	38/7
								1930	1929
SHIPMENTS OF RICE.									
Saigon to Europe	(shill. per 25/-	(1)25/-	25/-	n.25/-	25/-	n.21/6	n. 27/0	n. 18/11	n. 20/1
Burma to U.K./Continent	24/-	24/-	23/-	22/-	n.23/4	17/0	25/11	n. 17/8	n. q.

(1) Rates for parcels by liners. — (2) "Down River", includes the ports Buenos Aires and La Plata. — (3) "Up River", includes the ports on the Paraná River as far as San Lorenzo. Cargoes from ports beyond San Lorenzo (Colastine, Santa-Fé and Paraná) are subject to an extra rate of freight. — (4) The original data being quoted in "scale terms", 10 % is added to arrive at freights per 2,240 lbs.

MONTHLY CROP REPORT

AND AGRICULTURAL STATISTICS

The following notes refer to crop conditions quoted in the crop reports and in the tables. — Crop condition according to the system of the country: Germany, Austria, Hungary, Luxemburg and Czechoslovakia: 1 = excellent, 2 = good, 3 = average, 4 = bad, 5 = very bad; France: 100 = excellent, 70 = good, 60 = fairly good, 50 = average, 30 = bad; Lithuania, Poland, Sweden and Switzerland: 5 = excellent, 4 = good, 3 = average, 2 = bad, 1 = very bad; Netherlands: 90 = excellent, 70 = good, 60 = fairly good, 50 = below average; U. S. S. R.: 5 = good, 4 = above the average, 3 = average, 2 = below average, 1 = bad; United States: 100 = crop condition which promises a normal yield. — For other countries the system of the Institute is employed: 100 = crop condition which promises a yield equal to the average of the last ten years.

CEREALS

The spring is generally a period of great uncertainty for the world wheat market as the quantities to be carried over to the next season are still not exactly determined and information is still inadequate concerning prospects for the new crops on which will finally depend the possibility and conditions of disposal of the surpluses.

The statistical situation of the present season has already been much discussed and has largely worked out its influence on the market, yet the fact is not without importance that current information all tends to confirm that the stocks of exporting countries at the end of the season will be very much larger than last year and will even exceed previous forecasts.

The latest estimates of stocks in existence in Canada and the United States lead to the conclusion that the home consumption of the two countries, which has been one of the most doubtful elements in the estimation of exportable surpluses, has been somewhat smaller than was calculated. The quantities which were used for feeding livestock and which, owing to the shortage of maize and its relatively high price, were considered by some to be exceptionally high, appear, on the contrary, to be not much larger than last year and this only in the United States, whereas in Canada they are smaller.

In fact, the quantity in existence in Canada on March 31 was 165 million centals (275 million bushels). Since, at the beginning of August, home supplies for consumption and export amounted to 305 million centals or 510 million bushels (67 million centals or 112 million bushels of stocks from old production in existence in Canada plus 238 (398) of new production) it is found that in the eight months from August 1 to March 31, 140 million centals (235 million bushels) were disposed of, of which 110 (183) were exported and 30 (52) consumed in the country. This figure of home consumption is smaller by over 5 million centals (10 million bushels) than that calculated in the same way for the corresponding period of last year. It may be that this diminution is only apparent and depends on the provisional nature of the estimate of production in 1930, which is subject to revision; in any case, the fact remains that the quantity exportable from Canada should be larger than has been previously estimated. It was, in fact, calculated at 225 million centals (380 million bushels) by deducting from the total supplies of Canadian wheat — 305 million centals (510 million bushels) in the country and 10 million (15 million) in the United States —, the quantity necessary for home requirements (90 million centals or 145 million bushels) this quantity being presumed to be very much larger than that consumed last year (70 million centals or 115 million bushels). On the basis of

March 31 it is found that either such an increase of home consumption has not taken place, or supplies have been larger than they appeared to be on the basis of the estimate of production and stocks at the beginning of the season. In either case the Canadian surplus should be larger than has been anticipated; it is probable, according to present data, that it may reach 245 million centals (405 million bushels).

For the United States, stocks in existence in the country in all places at the beginning of March amounted, according to an approximate calculation (1), to 330 million centals (550 million bushels) whereas at the beginning of the season supplies were as high as 690 million (1,150 million). In the eight months from July 1, 1930 to March 1, 1931, there have been consequently disposed of, about 360 million centals (600 million bushels), and deducting from this figure the 60 million (100 million) exported, there would remain about 300 million (500 million) consumed in the country. On the basis of the same calculation, home consumption in the corresponding period of last year was 275 million (460 million). In determining, last November, the quantity exportable from the United States, it was, on the contrary, calculated that the quantity to be consumed in the country would exceed, by a large though not exceptional amount, the quantity of 380 million centals (633 million bushels) consumed in 1929-30 and such consumption was estimated at 430 million (720 million). It now results that the quantities absorbed for home requirements during the first eight months of the current season have increased only very moderately compared with last year. It is therefore necessary, on the basis of the current data, to reduce the figure of home requirements in the United States by 20 million centals (40 million bushels) and to increase, by the same amount, the exportable surplus. Due to these modifications in the surpluses of Canada and the United States, the world exportable stocks of wheat to be carried over on August 1, 1930 should reach 290 million centals (480 million bushels), this being a record figure, exceeding even the maximum attained, in August 1929, of 265 million centals (440 million bushels).

* * *

As far as the prospects of the new crop are concerned, information available at the Institute can be summarised as follows.

The data of areas sown to winter cereals in Europe are still incomplete, but information available seems to confirm the impression that they will not differ greatly from those of last year for all European countries together, excluding the U. S. S. R. where they will, on the contrary, be increased.

March weather was characterised by low temperatures for the season. In the more northern countries (Poland, the Baltic countries and a vast area of the U. S. S. R.), fields were still largely covered with snow at the end of the month. In various countries of Central Europe, abrupt falls in temperature, especially towards the end of March, delayed the growth of winter cereals and night frosts caused some damage, particularly in Germany, Belgium, Luxemburg, Austria, Czechoslovakia and Hungary where crop condition at the beginning of April was judged to be a little less favourable than at the same date of last year. In France, on the contrary, a series of sunny days partly repaired the effects of the excessively wet weather which prevailed during the winter. Condition of the sowings was, on the whole, promising in Italy and the Danubian countries. Field work and spring sowings are generally in delay.

In the United States the latest information confirms that the course of the winter

(1) Stocks in farmers' hands, visible commercial stocks and stocks in interior mills and elevators on March 1, amounted to 271 million centals (451 million bushels). To this figure there is reason to add the stocks on the same date in merchant mills and attached elevators (including stocks of flour and those in transit), which, according to a rough calculation, may be estimated to amount to at least 58 million centals (100 million bushels).

was favourable to winter wheat and damage to sowings is relatively very restricted. Although the estimate of area abandoned as a result of such damage will not be made until May, an indication of the area to be harvested may already be obtained from the information furnished by farmers, according to which the latter expect, on the basis of the situation at the beginning of March, to harvest 39,759,000 acres of the 42,042,000 sown last winter. On the basis of this indication the percentage acreage abandoned due to winter-killing (5.4 %) would be the lowest for the last ten years with the exception of 1921, in which it was 4.8 %.

The favourable winter weather and the beneficial conditions for winter wheat during March are reflected in the crop condition on April 1 which also appears to be the most favourable recorded in the last ten years with the exception of 1921.

Winter wheat in the United States.

Year of production	Area		% of area sown not harvested	Crop condition April 1
	sown	harvested		
	(thousand acres)			
1931	42,042	(1) 39,759	5.4	88.8
1930	42,513	38,608	9.2	77.4
1929	42,820	40,059	6.4	82.7
1928	47,317	36,213	23.5	68.8
1927	43,373	37,723	13.0	84.5
1926	39,887	36,987	7.3	84.1
1925	39,051	31,346	21.5	68.7
1924	38,916	35,656	8.4	83.0
1923	46,091	39,508	14.3	75.2
1922	47,930	42,358	11.6	78.4
1921	45,625	43,414	4.8	91.0

(1) Acreage which farmers expect to harvest, on the basis of the situation on March 1.

Taking into account the relationship between crop condition on April 1 and yields obtained, over a series of past years, it is calculated by the Department of Agriculture that, to the crop condition on April 1, 1931, there would correspond a probable production of about 386 million centals (644 million bushels), which would be larger than the April 1 estimate of last year by about 56 million centals (94 million bushels) and would exceed the final harvest result of 1930 by about 24 million centals (40 million bushels). This figure of course gives only an approximate indication of the crop situation at the beginning of April and is not intended to be a forecast of production; harvest results will, naturally, greatly depend on the course of weather during the next few months. Weather conditions in the first half of April, on the whole, continued to be favourable.

With regard to spring sowings, farmers' intentions to plant, as reported at the beginning of March, indicated an area of spring wheat about 15 % smaller than that of last year; on the basis of these intentions and taking into account the average difference in recent years between farmers' intentions on March 1 and actual sowings, the Department of Agriculture calculates a figure of about 17,682,000 acres compared with 20,545,000 actually sown in 1930.

Combining this figure with that given above for winter wheat, the total area at present expected to be harvested in the United States in 1931, compared with 1930 and the previous five years is given in the table at page 196.

With reference to India, the first estimate of production in the Punjab is already known; the latter contributes about 35-40 % of the total production of the country.

Despite previous anxiety caused by drought, results appear to be satisfactory, although about 7 % below the figure forecasted at the same date of last year. The production estimate for all India will not be known until towards the end of the month.

Area harvested in the United States
(thousand acres).

Year of production	Winter wheat	Spring wheat	Total
1931	(1) 39,750	(2) 17,682	57,441
1930	38,608	20,545	59,153
1929	40,059	21,405	61,464
1928	36,213	22,059	58,272
1927	37,723	21,061	58,784
1926	36,887	19,372	56,259
1925	41,346	21,021	62,367

(1) Acreage which farmers expect to harvest on the basis of the situation on March 1. — (2) Acreage which farmers intended to plant to spring wheat as reported on March 1.

Taking into account the forecast of production in the Punjab and the fact that in the remainder of India there has also been an increase in areas sown of about 1,200,000 acres, it seems probable that total production may approach the figure of 1930 (1).

Production of wheat in India.

Year of production	First estimate				Final estimate			
	Punjab		India		Punjab		India	
	000 centals	000 bushels	000 centals	000 bushels	000 centals	000 bushels	000 centals	000 bushels
1931	81,267	135,445	220,976	363,263	94,259	157,099	231,907	386,512
1930	87,853	146,421	184,410	307,366	76,675	127,792	102,438	320,731
1929	69,171	115,285	198,638	331,147	81,914	103,187	174,518	290,864
1928	74,144	123,573	194,025	324,875	76,854	128,091	200,965	334,992
1927	70,224	117,040	182,237	320,395	75,757	126,281	194,790	324,651
1926	64,915	108,192	193,178	321,963	66,774	111,291	198,598	330,997
1925	65,595	103,275						

In Japan, the crop condition of wheat at the beginning of April was bad.

In the countries of Northwestern Africa the course of the season has favoured cereals except in Southern Tunisia, where the drought has continued ; in Egypt normal yields are anticipated.

In Argentina and Australia weather conditions are favourable to sowings but a reduction of areas sown is anticipated. According to information received at the last moment, the area to be sown in Australia this year will be about 13,500,000 acres compared with 18,160,000 last year.

G. C.

* *

Germany : The winter up to the first days of March was prevalently mild and the abundant precipitation also favoured sowings. Night frosts, however, followed by relatively high day temperatures were rather prejudicial to fields devoid of snow covering. Owing to the generally low temperatures in March growth was backward as compared with last year. Spring operations, too, were begun only in April.

Austria : At the beginning of March there was a fall in temperature and heavy snow. With the subsequent clearing of the weather severe frosts occurred. The brief spell of

(1) At the last moment there has been received the first estimate of wheat production in India of 208,096,000 centals (346,827,000 bushels).

warm weather at the end of March was followed by a renewal of the cold weather. Winter cereals, especially winter wheat in the valleys, have suffered considerable damage by cold. Rye and winter barley are many cases affected by moulds.

Since the meeting of the snow in the valleys occurred only at the beginning of the third decade of March preparations for spring sowings were retarded. The cold at the end of March caused further delay.

Belgium : The first ten days of March were characterised by generally heavy precipitation. The weather then cleared up and became dry and cold, with sunny days but sharp night frosts and predominance of east and northeast winds.

Growth was checked by the cold weather. Winter cereal sowings are poor and thin and much wheat will have to be re-sown.

During the latter half of the month field work was hastened in backward fields and spring wheat and oat sowing was begun under fairly good conditions.

Bulgaria : In the first half of March temperature fell slightly ; rain was scanty. Between 15 March and the end of the month there was a further considerable fall in temperature hindering work in the fields.

Irish Free State : During the greater part of March the weather favoured preparations for spring sowings. Actual sowings of oats and barley have been carried out only to a relatively small extent and in the drier districts.

Despite cold, wet weather at the beginning and end of the month, no serious damage to growing crops was reported.

France : In the second half of March a considerable improvement took place in the condition of cereal stands ; warm, sunny weather allowed a vigorous recovery in growth and the general condition of remaining winter crops seemed fairly good. The fine weather favoured manure spreading, harrowing, and sulphuric acid treatment for the destruction of weeds, which are particularly widespread this year.

This favourable period permitted the intensification of spring work and the partial making up of arrears.

It was possible to re-sow much winter wheat and to make more progress with spring sowing than was expected but most sowing for this period has been of barley and oats. Sowings at present completed have been favoured in most areas by excellent conditions with warmth and light rains at the time of sprouting.

The southwestern area has not been favoured by such conditions ; the rainy weather lasted until the beginning of April and the situation of both cereal stands and spring sowings remains mediocre and, in some cases, bad.

The situation has, on the whole, improved but there is reason to anticipate a probable reduction in total wheat sowings. It must also be taken into account that the crop situation is not good everywhere and that mild rainy winters such as the past one, excepting subsequent exceptionally favourable conditions, generally result in poor production.

Great Britain and Northern Ireland : The winter of 1930-31 has been characterised by the absence of extreme conditions, but has not, on the whole, been favourable to agriculture. The land has been very wet and difficult to work and severe and continued frosts have been absent, so that cultivation and sowing have been interrupted and retarded in most areas. During the first part of March wintry conditions prevailed, especially in Northern England and in Scotland, where there were heavy falls of snow, interrupting ploughing and sowing, while sharp frosts were experienced in Scotland and in most parts of England. During the latter half of the month, however, the weather was generally dry with some spells of sunshine, though the prevalence of cold winds tended to retard growth. Considerable progress with cultivation and sowing was made during

Area and Crop Condition.

COUNTRIES	AREA SOWN					CROP CONDITION (%)										
	1930-31	1929-30	Average 1924-25 to 1928-29	% 1930-31		1-IV-1931			1-XII-1930			1-IV-1930				
				1929-30 = 100	Aver = 100	a)	b)	c)	a)	b)	c)	a)	b)	c)		
															Thousand acres	
WINTER WHEAT																
Germany	(1) 4,324	(2) 3,996	(2) 3,705	—	—	—	—	3.0	—	—	—	—	—	—	2.5	—
*Austria	...	479	475	...	...	2.6	—	—	2.3	—	—	—	—	—	2.5	—
Bulgaria	2,908	2,908	2,624	100.0	110.8	d)	—	—	—	—	—	—	—	—	d)	—
Spain (3)	10,872	10,531	10,743	103.2	101.2	—	—	—	—	—	—	—	—	—	—	—
Finland	32	30	25	108.0	128.6	—	—	—	—	—	—	—	—	—	—	—
*Scotland	...	54	56	...	...	—	—	—	95	—	—	—	—	—	—	100
Italy	11,893	11,759	(4) 12,060	101.1	98.6	—	—	—	—	—	—	—	—	—	—	—
Lithuania	410	362	225	113.3	182.5	—	—	—	—	—	—	—	—	—	—	—
Luxemburg (3)	25	25	30	99.9	83.8	—	—	3.7	—	—	—	—	—	—	—	—
*Poland	...	3,714	3,099	...	...	3.4	—	—	(5) 3.5	—	—	—	—	—	3.5	—
Rumania	6,154	6,873	7,054	89.5	87.2	120	—	—	—	—	—	—	—	—	—	—
*Switzerland	...	128	117	...	...	—	—	—	94	—	—	—	—	—	—	99
*Czechoslovakia	...	2,022	1,769	...	...	2.9	—	—	—	—	—	—	—	—	2.5	—
Ukraine	13,902	9,790	(6) 7,265	142.0	191.4	—	—	—	—	—	—	—	—	—	—	—
Total Europe	(m) 36,618	36,484	36,406	100.4	100.4	—	—	—	—	—	—	—	—	—	—	—
	(n) 50,520	46,274	43,731	109.2	115.5	—	—	—	—	—	—	—	—	—	—	—
Canada	894	1,042	947	85.8	94.4	—	—	—	—	—	—	—	—	—	—	—
United States	42,042	42,513	42,950	98.9	98.0	88.8	—	—	86.3	—	(5) 96	—	—	—	—	77.4
Total America	42,936	43,555	43,597	98.6	98.6	—	—	—	—	—	—	—	—	—	—	—
India	31,004	29,871	31,104	103.8	99.7	—	—	—	—	—	—	—	—	—	—	—
*Japan	...	1,198	1,174	...	...	—	—	g)	—	—	—	—	—	—	f)	—
Total Asia	31,004	29,871	31,104	103.8	99.7	—	—	—	—	—	—	—	—	—	—	—
Algeria	3,081	3,944	3,654	78.1	84.8	—	—	—	—	—	—	—	—	—	—	—
*Egypt (3)	...	1,577	1,554	...	...	—	—	100	—	—	—	—	—	—	101	—
Tripolitania	17	12	...	140.0	...	—	—	—	—	—	—	—	—	—	—	—
Tunis	1,730	(4) 1,728	1,719	100.0	100.6	120	—	—	—	—	—	—	—	—	—	—
Total Africa	4,811	5,672	5,373	84.8	89.5	—	—	—	—	—	—	—	—	—	—	—
Grand Totals	(m) 115,369	115,582	116,540	99.8	99.0	—	—	—	—	—	—	—	—	—	—	—
	(n) 129,271	125,372	123,905	103.1	104.4	—	—	—	—	—	—	—	—	—	—	—
WINTER RYE																
Germany	(1) 10,379	(2) 11,460	(2) 11,416	—	—	—	—	3.0	—	—	—	—	—	—	2.5	—
*Austria	...	880	892	...	...	2.7	—	—	2.2	—	—	—	—	—	2.4	—
Bulgaria	583	614	445	95.0	130.0	d)	—	—	—	—	—	—	—	—	d)	—
*Spain (3)	1,544	1,446	...	106.7	...	—	—	—	—	—	—	—	—	—	—	—
Finland	556	556	565	100.0	98.5	—	—	—	—	—	—	—	—	—	—	—
Lithuania	1,136	974	(1) 1,192	116.6	...	—	—	—	3.3	—	—	—	—	—	—	—
Luxemburg (3)	22	22	17	100.2	136.9	—	—	—	—	—	—	—	—	—	—	—
*Poland	...	14,500	18,938	...	...	3.4	—	—	(5) 3.6	—	—	—	—	—	3.7	—
Rumania	865	914	651	94.6	132.8	120	—	—	—	—	—	—	—	—	—	—
*Switzerland	...	49	47	...	...	—	—	—	90	—	—	—	—	—	—	99
*Czechoslovakia	...	2,009	2,406	...	...	—	—	—	3.1	—	—	—	—	—	2.5	—
Total Europe	13,541	14,540	14,286	93.1	94.8	—	—	—	—	—	—	—	—	—	—	—
Canada	944	1,166	639	81.0	147.8	—	—	—	—	—	—	—	—	—	—	—
United States (5)	4,158	3,996	3,909	104.1	109.2	—	—	—	81.6	—	(5) 98	—	—	—	—	82.0
Total America	5,102	5,162	4,448	98.9	114.7	—	—	—	—	—	—	—	—	—	—	—
Algeria	5	3	3	143.2	144.8	—	—	—	—	—	—	—	—	—	—	—
Grand Total	18,648	19,765	18,737	94.6	99.5	—	—	—	—	—	—	—	—	—	—	—
WINTER BARLEY																
Germany	(1) 494	(2) 486	...	...	...	2.9	—	—	2.6	—	—	—	—	—	2.7	—
Austria	...	18	24	...	...	2.8	—	—	2.3	—	—	—	—	—	2.6	—
Bulgaria	514	514	438	100.0	117.3	d)	—	—	—	—	—	—	—	—	d)	—
Spain (3)	4,390	4,390	...	100.0	...	—	—	—	—	—	—	—	—	—	—	—
Luxemburg	7	7	8	100.0	87.8	—	—	—	3.1	—	—	—	—	—	—	—
Poland	...	142	174	...	...	3.1	—	—	(5) 3.5	—	—	—	—	—	3.3	—
Rumania	248	323	252	76.8	98.5	—	100	—	—	—	—	—	—	—	—	—
Switzerland	...	16	16	...	...	—	—	—	94	—	—	—	—	—	—	99
Japan	...	2,110	2,336	...	...	—	—	—	g)	—	—	—	—	—	f)	—
Algeria	3,042	3,002	3,446	84.5	88.3	—	—	—	—	—	—	—	—	—	—	—
Egypt	...	345	368	...	...	—	—	100	—	—	—	—	—	—	102	—
Tripolitania	371	247	...	150.0	...	—	—	—	—	—	—	—	—	—	—	—
Tunis	988	988	1,243	100.0	79.5	—	100	—	—	—	—	—	—	—	—	—

COUNTRIES	AREA SOWN						CROP CONDITION (†)								
	1930-31	1929-30	Average		% 1930-31	Aver.									
			1924-25												
			to												
			1928-29	1929-30											
Thousand acres	100	100	1-IV-1931	I XII-1930			I-VI-1930								
				a)	b)	c)	a)	b)	c)	a)	b)	c)			
WINTER OATS															
Spain (3)	1,603	1,840	—	92.1	—	—	—	—	—	—	—	—	—		
Luxemburg (3)	70	70	72	100.0	97.6	—	3.0	—	—	—	—	—	—		
Algeria	544	632	605	86.0	89.9	—	—	—	—	—	—	—	—		
Tunis	99	99	104	100.0	94.7	—	100	—	—	—	—	—	—		
WINTER SPELT															
Germany	..	293	301	..	..	2.8	—	—	2.6	—	—	2.5	—

* Countries not included in the totals. — a) above the average b) average — c) below the average
d) very good — e) good — f) average — g) bad — h) very bad — m) not including Ukraina — n) including Ukraina — (†) See explanation according to the various systems, page 193 — (1) December estimate — (2) May estimate — (3) Autumn and spring crop (4) Year 1928-29 — (5) 1st November 1930 (6) Average 1924-25 to 1927-28 (7) Provisional estimate made last year on the same date — (8) Average sown for grain, allowance being made for average diversion to other uses.

* Countries not included in the totals — a) above the average — b) average — c) below the average
 d) very good — e) good — f) average — g) bad — h) very bad — m) not including Ukraina — n) including Ukraina — (†) See explanation according to the various systems, page 193 — (1) December estimate — (2) May estimate — (3) Autumn and spring crop — (4) Year 1928-29 — (5) 1st November 1930 — (6) Average 1924-25 to 1927-28 — (7) Provisional estimate made last year on the same date — (8) Average sown for grain, allowance being made for average diversion to other uses

this period, and although this work was still backward in some districts, much of the arrears existing at the beginning of the month were overtaken both in England and Wales and in Scotland

With the exception of heavy wet soils that were ploughed late, the land has worked well, having benefited from the frosts in the earlier part of March, and good seed beds were, as a rule, obtained. In England and Wales sowing proceeded rapidly during the latter part of the month but at the end of the month was still rather in arrears, especially in the north. In Scotland spring sowings of wheat were completed in several districts, but seeding of other cereals was retarded by the adverse weather conditions at the beginning of the month. In England and Wales the germination of the earlier sown seed appears to have been satisfactory but on the whole little spring corn was showing. Reports indicate that rather less wheat has been sown this spring in England and Wales.

During the early part of March the growth of autumn-sown crops was checked by the frosts and cold winds, but with the improvement in weather conditions toward the end of the month, crops were as a rule of good appearance and making some progress, though in Scotland condition of autumn sowings was slightly below average. In England and Wales wheat was generally strong and healthy, though with a tendency to loss of colour and some patchiness on heavy wet lands; barley, especially on the lighter lands, had made some progress and looked promising, although a little backward, oats appeared healthy and even, while rye was strong and vigorous.

In Northern Ireland farmers were enabled to make up arrears of ploughing and tillage was well advanced for the time of year. In some districts sowing of oats was begun. Winter sown wheat was in fairly good condition though in some places rather backward for the season.

Greece : In the second half of March there was a marked fall in temperature accompanied at the end of the month by a somewhat heavy fall of snow in many districts. There is as yet no exact information regarding the effects on cereals of this brusque return of winter but no damage is expected to have been suffered provided the ears had not begun to form.

Hungary : In the three weeks from 13 March to 3 April the weather was characterised by excessively low temperatures and marked lack of precipitation. The cold weather has generally retarded agricultural operations. Wheat and winter rye have wintered

well, though the cold in the first half of March hindered their development and sporadic frost damage is reported. Owing to the cold, preparations for the spring sowings of wheat and rye were in various localities interrupted. Sowings of barley and oats were commenced on sandy soils.

Italy : Weather in March was prevalently rainy ; toward the close of the month temperature fell and in some provinces there was snow. Wheat has a fairly good appearance though in some districts the crop is infested by weeds and in others excessive moisture has caused heaving and yellowing. Spring sowings are generally rather backward since the weather conditions and the wetness of the soil have hindered field work.

Latvia : In March, especially in the first decade, the weather was very cold while during the remainder of the month it was warmer, though with rather severe nocturnal frosts. Precipitation was normal. The snow cover became still heavier in March and the melt began only slowly in the third decade of the month.

Lithuania : Weather in March was favourable. The ground was frozen to sufficient depth and the snow cover was very thick. So far the early spring has been propitious. Sowings have not yet begun.

Luxembourg : Owing to persistent frosts numerous resowings of autumn crops, especially wheat, have been necessary. Preparations for spring sowings and sowings themselves have been effected under average conditions.

Poland : Toward the middle of March the greater part of the country was still covered with snow. Preparations for spring sowings were hindered and actual sowings had not yet commenced at the end of March.

According to information sent to the Institute by the Central Bureau of Statistics at the beginning of April, the final estimates of area and production of cereals in 1930, compared with those for 1929 and the average for the preceding five years are as follows :

Crop	1930	1929	Average 1924 - 28	% 1930 1929 = 100	Average 1924 - 28 = 100
<i>Area (ooo acres).</i>					
Wheat	4,066	3,526	3,230	115.3	125.9
Rye	14,567	14,328	13,719	101.7	106.2
Barley	3,048	3,110	2,761	98.0	110.4
Oats	5,404	5,416	4,889	99.8	110.5
<i>Production.</i>					
Wheat (ooo centals) . . .	49,394	39,517	32,896	125.0	150.2
(ooo bushels) . . .	82,321	65,861	54,825		
Rye (ooo centals) . . .	153,399	154,539	122,034	99.3	125.7
(ooo bushels) . . .	273,928	275,964	217,919		
Barley (ooo centals) . . .	32,274	36,592	27,635	88.2	116.8
(ooo bushels) . . .	67,238	76,235	57,574		
Oats (ooo centals) . . .	51,756	65,105	45,018	79.5	115.0
(ooo bushels) . . .	161,737	203,451	140,681		

Rumania : At the beginning of April the condition of autumn sowings was good throughout the country. Preparatory work for spring sowing was begun in only a few areas owing to the too frequent precipitation and excessive soil moisture.

Switzerland : Late snowfall and dry, cold weather have considerably retarded growth. Cereals which could not be sown until rather late last winter, have been damaged in the spring by persistent snow. Wheat and spelt have wintered best but rye seems to have

been particularly damaged by the snow ; for all winter cereals the condition of sowings is considerably less satisfactory than at the same date of last years. Some re-sowing is reported to be necessary in different regions. Favourable weather in the next few weeks may aid improvement. Preparatory work for spring sowings has been delayed by the persistence of snow but they have effected so far under favourable conditions.

Crop conditions of spelt on April 1, 1931 and on the same date of last year were 94 and 99 ; and those of mixed grain 93 and 101.

Czechoslovakia : The snow that fell in considerable amount at the beginning of December over the greater part of the country remained only in the upland regions, having mostly disappeared in the lowlands, especially in localities with a southern exposure.

The weather in March was very variable ; frost, thaw, snow, and rain succeeded each other ; temperature remained at a relatively high level, reaching 15°C. by day and 10°C. by night. On 1 April the land was still frozen and the upland districts were covered with snow.

These conditions have been prejudicial to winter cereals, the roots of which have suffered greatly, especially in the case of rye, from alternate freezing and thawing ; in many districts rodents have also caused damage.

On 1 April work in the fields had not yet begun ; it was expected that there would be a delay of two weeks both in this work and in vegetative development.

Yugoslavia : Weather in March was changeable with a considerable fall in temperature in the second half of the month. At the beginning of April crop condition of winter cereals was good, particularly that of wheat.

According to a communication from the Ministry of Agriculture to the Institute the final estimates of area harvested and of production of cereals in 1930 compared with those of 1929 and of the mean of the five years ending 1928 are as follows :

Products	1930	1929	Average 1924 to 1928	1929 % = 100	1930 Aver. = 100
<i>(Areas harvested in 000 acres).</i>					
Wheat	5,246	5,213	4,387	100.6	119.6
Rye	610	587	497	103.9	122.8
Barley	1,097	1,055	912	104.0	120.3
Oats	1,009	954	888	105.9	113.7
<i>(Production in 000 centals).</i>					
Wheat	48,197	57,000	44,125	84.6	109.2
Rye	4,382	4,630	3,843	94.6	114.0
Barley	8,915	9,080	7,819	98.2	114.0
Oats	6,283	7,733	7,332	81.2	85.7
<i>(Production in 000 bushels).</i>					
Wheat	80,326	94,998	73,541	84.6	109.2
Rye	7,825	8,268	6,862	94.6	114.0
Barley	18,574	18,918	16,291	98.2	114.0
Oats	19,634	24,166	22,912	81.2	85.7

U. S. S. R. : At the beginning of March snow still covered most of the country except the North Caucasus, the southern Ukraine, the Lower Volga and southern parts of the Asiatic territory of the Union. Weather during March was rather cold, especially towards the end of March, when there was further snowfall in part of the southern area,

where the spring sowings already begun had to be interrupted, to be re-commenced later in the first ten days of April. It may, in general, be said that the season is late this year and consequently the sowing period will be shorter than usual.

Chile : The following are the provisional data for production in 1930-31 compared with the final estimates for last year and the average of the five years ending 1928-29.

Products	1930-31	1929-30	Average 1924-25/ 1928-29	% 1930-31 1929-30 = 100	Aver. = 100
Wheat (ooo centals) . . .	14,354	22,231	16,168	64.6	88.8
(ooo bushels) . . .	23,923	37,052	26,946		
Barley (ooo centals) . . .	2,072	3,394	2,717	61.1	76.3
(ooo bushels) . . .	4,317	7,071	5,660		
Oats (ooo centals) . . .	1,790	3,329	1,825	53.8	98.1
(ooo bushels) . . .	5,594	10,403	5,702		
Rye (ooo centals) . . .	68	79	57	86.1	120.5
(ooo bushels) . . .	122	142	101		

The harvest has generally been very small owing to the smaller area sown and to the unfavourable weather.

United States : According to telegraphic information received from the United States Department of Agriculture, on about March 18, winter wheat was in healthy and strong condition. In Kansas and part of the Pacific Coast, growth was excellent. The melting of snow in the Ohio and Central Mississippi Valleys materially helped winter wheat, condition varying generally from good to excellent. There was still a need for rain in the Upper Mississippi Valley, Oklahoma and, in the East, north of North Carolina; in the latter area condition varied from poor to good. Growth was delayed by cool weather in the Southeast. In the following week until about March 25 the weather was generally favourable to winter wheat the crop condition of which was good. Spring cereal sowing progressed well during the week.

In the last week of March cold weather set in accompanied by generally heavy snows and rains as far south as central Texas. This precipitation was beneficial to winter cereals and improved soil moisture conditions generally. In Oklahoma and western Texas there was some frost damage to winter wheat and oats but the snow cover afforded protection in many districts. The cold weather rather slowed up growth. Spring wheat sowing was stopped generally by the inclement weather but oat seeding advanced and has been practically completed. In general, spring farm work is well advanced for the season.

On about April 8, crop condition of winter wheat was good and growth in the following week was generally very good. Spring wheat sowing progressed fairly well in the second week of April; in the second week there was an occurrence of hot, drying winds which may necessitate partial re-sowing.

The Department of Agriculture stated that while the extent of winter injury to wheat is still undetermined and the possibility of spring damage still exists, farmers' reports of acreage which it appeared on March 1, would be harvested for grain, indicated less than average abandonment. Of the 42,042,000 acres sown last winter farmers now expect to harvest 39,759,000 acres compared with 38,608,000 harvested last year and 36,467,000, the average of 1925-29; percentages: 103.0 and 109.0.

According to a telegram of April 9, the preliminary estimate of production of winter wheat in 1931, based on crop condition on April (88.8 % of the normal compared with 77.4 % on April 1, 1930) and the past relationship of condition and yield, is 386,400,000 centals (644,000,000 bushels) compared with 362,602,000 (604,337,000) harvested last

year and the average of 328,463,000 (547,427,000) for 1925-29 ; percentages : 106.6 and 117.6. With reference to the high figure of production given it may be remarked that weather during the past winter was favourable to crops, but the figure is of course very approximate as production will largely depend on the course of the season during the months still to elapse before harvest.

The following statement was made by the United States Department of Agriculture of farmers' intentions to plant as on March 1, 1931. This statement is not a forecast of the acreage that will be actually planted ; the latter will depend on weather conditions during the months to elapse before harvest, price changes, labour supply, etc.

Intended plantings in 1931 in per cent of the acreage grown for harvest in 1930.

	Durum	Spring wheat Other	Total	Barley	Oats
% of area grown for harvest in 1930	76.1	88.0	85.3	112.0	106.5
Area harvested in 1930 (in thousand acres) .	4,643	15,902	20,545	12,437	41,598

With respect to spring wheat, farmers report intentions to reduce the acreage sown by about 15 % compared with 1930 ; in this connection it is interesting to note that the Federal Farm Board announced on March 22nd. that the Grain Stabilisation Corporation will not purchase wheat of the 1931 crop to stabilise prices and repeated its advice to farmers to reduce the wheat acreage.

According to planting intentions (14.7 % reduction compared with 1930) the spring wheat area would be 17,527,000 acres but allowing for average departures from intentions, the estimate is raised to 17,682,000 acres. Adding this figure to the estimated area for winter wheat (39,759,000 acres) the total area of wheat for harvest is 57,441,000 acres compared with 59,153,000 acres harvested last year, showing a reduction of about 3 %.

Given average yields on the acreage intended, a production of hard red spring wheat of about 89,000,000 centals (148,000,000 bushels) durum wheat of about 28,000,000 centals (47,000,000 bushels) and white wheat of about 16,000,000 centals (26,000,000 bushels) would result. Production of hard red spring wheat would therefore be a little smaller than last year while durum production would be about 20 % less. Hard red wheat production under such conditions would be upon a level a little smaller than the average domestic utilisation but the production of durum and white would still be sufficient for a large proportion of the crop to be available for export.

In the case of barley, in recent years harvested acreage has fallen below that intended by about 2 % indicating an acreage for harvest in 1931 about 10 % greater than that harvested in 1930 ; making allowance for departures from intentions in the sowing of oats the area for harvest would be 3.1 % greater than that harvested in 1930.

If average yields are obtained on the intended acreage, a crop of about 164 million centals (342 million bushels) would be produced compared with last year's crop of 156,429,000 centals (325,893,000 bushels). It is stated that barley growing for feed on the farm producing it is sound practice but where grown for market prospects are less favourable than they were for the 1930 crop.

The area reported last December to be sown to rye was 4,158,000 acres. Since then however, abandonment of fall sown rye in North Dakota appears to have been above the average ; taking into account this reduction and the spring sowings of rye, the Department of Agriculture estimates the combined area of winter and spring rye intended for harvest in the United States at 3,896,000 acres compared with 3,722,000 harvested last year and 3,601,000, the average of 1925-29 ; percentages : 104.7 and 108.2.

India : In the Punjab general light to moderate rains in the first ten days of March benefited crops but the remainder of the month was mostly dry ; there was some local damage by rust especially in the district of Gurgaon ; barley crops were damaged by

insects in Rohtak. At the end of March the condition and prospects of irrigated standing crops were generally average to good and of unirrigated crops below the average to average. In the United Provinces little rain fell in March except for light rains at the beginning of the month. Local damage was caused by hail, frost, drought and insects but at the end of the month crops were doing well and prospects were generally favourable. In the Central Provinces weather was mostly warm with variable light to moderate rains. There was some damage by rust in irrigated areas and embanked fields.

On March 19 the condition and prospects of wheat throughout India were reported to be, on the whole, good. According to a telegram received on March 9 the area of wheat in the Punjab for the season 1930-31 is 10,888,000 acres compared with 11,085,000 in the preceding season and 10,750,600, the average for 1924-25 to 1928-29; percentages: 98.2 and 101.3. Corresponding figures for production are: 1930-31: 81,267,000 centals (135,445,000 bushels); 1929-30: 87,853,000 (146,421,000); average: 68,804,000 (114,673,000); percentages: 92.5 and 118.1.

Palestine: In Northern Palestine, March was marked by heavy rains, well distributed. In the Haifa district, 258.5 millimetres fell this season as against 105.2 for the same period in 1930. On the contrary in Southern Palestine the "latter rains" have failed and further rain is badly needed. Winter crops show good prospects in Northern Palestine and only slight damage has been caused to lowlying crops by flooding. Both winter and afir wheat is developing well, in excellent condition and with every prospect of a good yield. The afir barley shows forward growth and is coming into ear in the northern areas of the coastal plain; winter barley is developing well and good yields are expected. In Southern Palestine the prospects of a good harvest of winter crops are not as general as in the North. Given further fair rains, good yields of wheat and barley may be expected from the Jaffa and Ramleh districts. Condition is generally poor to very poor in the southern parts and rains urgently needed. Cultivation for spring sowings is being carried out in good conditions in the North and average to very poor in the South. Sowing are commencing but rain is generally needed.

Turkey: According to the exchange of Istanbul, wheat production in 1930 was 62,313,000 centals (103,853,000 bushels) against 59,941,000 (99,900,000) in 1929 and 32,455,000 (54,090,000) on the average of 1927 and 1928, that is 104.0 and 192.0 % respectively in relation to these figures.

Algeria: In March crops considerably improved: the fine, sunny weather was interrupted towards the middle of the month by heavy showers. Growth has been vigorous; harrowing and weeding were effected under good conditions. Sowings have a generally good appearance except those put in late, which show insufficient tillering, have been damaged by lack of soil moisture in the winter and have not been harrowed and consequently are not altogether satisfactory.

Egypt: Weather conditions were favorable during most of the month and irrigation water was generally sufficient. In early sown areas and ordinary cultivations the development of the seeds is in the last stage, while the ears are forming in late sown areas in Lower and Middle Egypt. In Upper Egypt and Fayum harvesting has begun. Crop condition is normal. Smut is reported in most provinces as usual and rust in Assiut, Qena and Assuan. Harvesting of barley is in progress or commencing according to locality and a normal yield is expected. The usual attacks of smut have occurred in most provinces.

French Morocco: Abundant beneficial rains fell throughout Morocco in March, and though sowings have been late growth has been normal, sprouting having occurred in good conditions. The general appearance of crops is good, though the relatively low temperatures that have persisted since October have somewhat retarded growth, not, however, seriously.

Tunis : Rains, fairly well distributed in March in the north, favoured growth. In the south the drought was severe throughout the month and cereal crops appear to be heavily affected. Crop condition of the three cereals on 1 April was good in the north, average in the centre, bad in the south.

Preparations for spring sowings were carried out in March under good conditions, as also were the first sowings, which were begun by the end of March.

MAIZE

Hungary : During the first days of April preparation for sowings was in progress, though these have been delayed by cold.

Italy : Spring sowings have been begun.

United States : A little maize was planted at the end of March in the South but germination was slow and uncertain because of the wetness and low temperatures. In the second week of April in the maize belt the soil was working very well.

According to a statement of farmers' intentions to plant this spring made by the United States Department of Agriculture, the area planted to maize for 1931 should be 104.9 % of that grown for harvest in 1930 (100,820,000 acres). Taking into account, however, on the one hand the present prospect for a light abandonment of winter grains for which corn might be substituted, and on the other the present unusual advancement of ploughing and other spring work on farms, it seems likely that the area planted to maize this year will be greater than last year's harvested acreage by about 4.2 %.

If intentions are carried out and average yields obtained, a crop of about 1,643,600,000 centals (2,935,000,000 bushels) could be produced and could be about 41 % larger than last year's crop of 1,165,387,000 centals (2,081,048,000 bushels), and the largest crop since 1923.

It is anticipated that the market during the 1931-32 season will be less favourable than in the present season as it is intended to increase the acreage of other feed grains and prospects are favourable for winter wheat production so that maize will meet with competition from these products. Moreover, in view of the large increase in maize acreage outside the maize belt, the demand for maize in deficit producing areas is likely to be considerably less than last year.

Due to the mild weather, spring work is more advanced than usual and it is likely that planting of small grains will be finished in time to permit early planting of maize, given favourable weather.

Argentina : A large harvest is expected.

Mexico : Sowing of maize on irrigated land began in February in almost the whole of the Republic. Crop condition is in general good and the area will be much larger than that of last year.

French Morocco : Preparation of the land and sowings were carried out in good conditions with sufficient moisture. Area devoted to spring crops as a whole will be more important than last year. Higher temperatures are desirable for germination and sprouting.

Union of South Africa : Since the breaking of the drought in the maize-growing areas in December the crop has made extraordinarily rapid progress and many excellent stands are reported. Some damage has been caused by hail but the stalk-borer is very much less in evidence. In view of the general lateness of planting there is the possibility of considerable damage to yields from early frosts, but account cannot be taken of this factor at the present stage of the crop.

Maize

COUNTRIES	(†) AREA						(†) PRODUCTION							
	1930	1929	Average 1924 to 1928	% 1930/28	1930	1929	1930	1929	Average 1924 to 1928	1930	1929	Average 1924 to 1928	% 1930/28	1930
	1930/31	1929/30	1924/25 to 1928/29	1929/30	Average 1929/30 = 100	1930/31	1929/30	1924/25 to 1928/29	1930/31	1929/30	1924/25 to 1928/29	1929/30	Average 1929/30 = 100	1930/31
	1 000 acres						1 000 centals		1 000 bushels					
Austria	190	198	148	100.4	94.9	2 474	2 586	2 990	4 417	4 017	4 267	96.7	103.5	
Bulgaria	1 696	1,076	1 577	85.8	107.5	10,075	20,718	13 842	94 062	36,006	23,824	92.1	143.0	
Spain	1 072	1,006	1 088	106.6	98.5	15,303	13 894	13 257	27,827	24 794	28 679	110.2	116.4	
France	832	852	849	97.9	99.0	12 439	11 002	9 158	22,023	19 646	16 711	112.1	131.8	
Greece	337	344	532	97.9	67.1	2 094	3 342	3 502	4 810	5 967	6 253	80.6	76.9	
Hungary	2 964	2 774	2 590	106.0	102.5	29 308	39 554	30 947	52 328	70 092	71 816	74.1	78.4	
Italy	3 737	3 719	3 776	100.5	18.9	60 081	55 781	54 445	118,001	99 624	97 224	113.4	121.4	
Poland	233	218	216	106.8	108.0	1 847	2 101	1 975	4,299	3 752	3 455	87.9	95.5	
Rumania	10 989	11 549	10 026	122.3	119.1	87 043	140 702	90,232	155 435	251 414	159 343	61.8	97.5	
Switzerland	3	3	3	100.1	99.5	87	89	84	156	159	150	97.5	103.4	
Czechoslovak (1)	323	315	346	92.9	—	4 659	5 103	5 851	8 142	9 113	9 559	83.3	116.1	
Yugoslavia	5 026	5 729	—	103.4	118.4	70 381	91 441	65 801	136 395	163 287	117 501	—	—	
* U. S. S. R. (2)	9 623	8 783	(3) 8 303	109.0	115.9	—	92 815	(3) 79 918	—	165,741	(3) 142,711	—	—	
Total Europe	27 903	28 943	6 136	96.4	106.8	317 180	386 401	298 634	566 305	690 001	533 872	82.1	106.2	
Canada	162	152	203	106.5	79.9	2 680	2 902	4 400	4 801	5 186	7 976	92.6	60.2	
United States	100 829	97 806	100 172	103.0	100.7	1 165 887	1 403 614	1 511 886	2 031 048	2 614 132	2 690 80	79.6	—	
* Guatemala	245	347	330	70.5	74.3	—	2 883	2 351	—	5 050	4 198	—	—	
Mexico	7 318	7 228	7 8 8	101.7	93.3	29 203	35 594	40 283	52 147	59 691	87 917	87.4	99.3	
Total Amer.	108 339	10 236	108 53	102.9	100.1	1 197 279	1 500 210	1 565 597	2 137 996	2 678 946	2 785 700	79.5	76.6	
Syria and Leb.	103	17	120	156.3	97.8	9.3	92.4	1 311	1 702	1 647	2 341	103.3	72.7	
Algeria	21	23	23	89.4	84.0	116	131	141	207	270	251	78.6	82.3	
Kenya	12	24	169	90.7	125.5	3 563	3 717	2 089	6 374	6 638	3 380	96.0	170.9	
Fr. Morocco	964	900	539	110.7	123.2	2 947	3 055	3 324	5 173	5 455	3 916	94.8	87.1	
Tunis	42	40	43	84.9	97.3	132	143	103	236	230	184	92.3	124.2	
Un. of South Africa (4)	4 371	6 200	4 93	61.3	88.6	34 302	45 014	36 540	61 244	80 183	65 250	76.2	119.9	
Total Africa	330	7 196	5 711	73.8	93.0	41,016	52 060	42 197	73 244	93 002	75 351	75.8	97.2	
Grand Total	141,657	141,442	140,220	100.2	101.0	1,556,428	1,939,613	1,907,729	2,779,337	3,463,396	3,466,663	80.2	91.6	

(†) The two data mentioned refer to the years in which the harvest took place in the northern and southern hemispheres respectively. * Countries not included in the totals — (1) The figure for the averages is not exactly comparable with those of the years 1930 and 1929 owing to changes in the method of making estimates — (2) For 1930 area sown for the preceding years area harvested — (3) Average 1925 to 1928 (4) Area harvested on European farms only production comprises also that of the natives

RICE

The Rice Situation (1)

World production of rice excluding that of China for which no reliable statistics exist averaged 126 850 million pounds in the quinquennium 1924-25/1928-29 as compared with 115 080 million pounds in 1909/10/1913-14. The increase in production appears from the statistics to be due mainly to the expansion of the area under the crop, unit yields in most countries showing if anything a downward tendency. Production in 1929-30 was estimated at 127 374 million pounds and information from the principal producing countries indicates a considerably larger production for 1930-31.

Of the total world production in the last five years, 1925-26/1929-30, the monsoon borderlands of Asia from British India to Japan, the lands where rice culture originates

(1) All data for rice are here expressed in terms of milled rice and those for production refer to the year from 1 April to 31 March. Rice straw and rice meal are not included in the trade figures.

ed, produced 93 %, even excluding the production of China ; the proportion remains almost constant, though a slight decrease in this preponderance is noticeable since the pre-war quinquennium, when the proportion was 95 %. Were data for China included the proportion of the world total produced outside this area would, of course, appear still more insignificant. The corresponding proportions of the world area under rice in monsoon Asia in the post-war and pre-war periods were 94 % and 96 %.

Of the vast world production only a relatively small proportion enters into international commerce. The total international trade (gross exports), principally milled rice but including a certain proportion of rough rice, in the quinquennium 1925-29 averaged 16,560 million pounds, exports to China included, about 13 % of the world production, excluding China, and only about 8 % if the production of that country is included and assumed to be equivalent to that of India. It is with this comparatively small proportion that the international markets are concerned and of the 16,560 million pounds about two-thirds originated in three countries — British India (mainly Burma), French Indo-China, and Siam.

Production and net export of major exporting countries
(million pounds milled rice).

YEAR	Production			YEAR	Net export			
	Burma	Indo-China	Siam (seven inner circles)		Burma (1)		Indo-China	Siam (2)
					to foreign countries	to Indian ports		
1930-31	11,364	...	4,393	1930	5,188	2,016	...	...
1929-30	11,160	10,521	3,287	1929	3,929	2,269	2,927	2,188
1928-29	10,844	10,246	3,107	1928	3,378	2,856	3,558	2,858
1927-28	10,945	11,276	3,918	1927	4,384	2,415	3,358	3,292
1926-27	11,451	10,539	4,546	1926	4,621	1,456	3,244	2,488
1925-26	10,624	10,150	3,302	1925	4,805	2,753	2,904	2,588
1924-25	11,350	9,958	4,251	1924	4,138	1,042	2,009	2,166

(1) The official data are for rice both in the husk and not in the husk, but, as practically all the rice exported is milled, they have been taken to represent milled rice.

(2) Exports from Bangkok, which in the five years ending 1928-29 made up 98 % of the value of the total rice exports from Siam. Data refer to the season 1 April-31 March.

THE SITUATION IN THE THREE GREAT SURPLUS-PRODUCING COUNTRIES.

Burma, though it produces only 14.7 % of the total rice output of British India, as compared with 24.2 % in Bengal and 16.8 % in Bihar and Orissa, has, owing to its comparatively low density of population, by far the greatest surplus and generally exports about half its output, and about 85 % of India's total export. The level of Burmese production normally oscillates very slightly about 11,000 million lbs., irregularities in the monsoon rains being comparatively small in comparison with those experienced in other parts of British India. This year the area shows the normal small increase and, though rain was rather scarce in central Burma in October, the crop is stated to have been good, in many districts unusually good, the total production being estimated at 11,364 million lbs of cleaned rice, the largest since 1926-27 and an increase of 1.7 % on that of 1929-30 and of 2.7% on the average of the preceding five years. The surplus available for export from this year's crop is estimated to be 7,063 million lbs of milled rice against 6,153 estimated at the same time last year. As the growers do not possess the financial facilities to hold for better prices and are in fact experiencing greater difficulties than usual in obtaining loans, practically all of this surplus must pass into the hands of dealers.

Production in Indo-China
(million pounds milled rice).

Year	Cochin-China	Tonkin	Annam	Cambodia	Laos
1930-31	4,068	...	(1) 968	1,390	573
1929-30	3,779	3,381	1,503	1,073	695
1928-29	3,779	3,077	1,762	1,054	573
1927-28	4,161	3,269	1,704	1,374	677
1926-27	3,893	2,387	2,070	1,563	625
1925-26	3,457	3,155	1,657	1,273	608
1924-25	3,867	2,656	1,911	974	550

(1) Including only rice of the tenth month, which usually makes up about two-thirds of the total.

In French Indo-China there are, for the same reasons as in Burma, large and comparatively uniform surpluses. The leading producers are Cochin-China and Tonkin; in the former production this year is more than 7 % above that of 1929-30, due mainly to higher unit yields, while in the latter, though an estimate is not yet available, a good total yield is expected. In Annam the crop of the second half-year shows an increase of 9 % over the corresponding crop last year, the increase of 25 % in area under this crop having apparently been largely counteracted by the drought and floods in the north-central and southern portions of that State. In Cambodia the total crop is 30 % greater than that of last year, the effect of good yields having been much greater than that of the small increase in area.

In Siam, too, despite flood damage in some districts and an area little above that of last year, the crop has been a large one and in the seven inner circles, which have about three-fourths of the rice area and produce practically all of the export, the output is one of the largest of recent years, stocks available for export in 1930-31 being estimated at 2,615 million lbs., 27 % more than estimated for last year. Besides this there is a carryover of 299 million lbs from the old crop and some rice is expected to come down by rail from the northern and northeastern circles this season in addition.

CONDITIONS IN THE PRINCIPAL RICE-IMPORTING COUNTRIES.

The dense populations of monsoon Asia not only produce the vast bulk of the world's rice but account for all but an insignificant part of world consumption. International trade in rice outside these countries is therefore relatively very small and, were the immense trade in this foodstuff carried on inside their respective frontiers taken into account, would seem still more unimportant. Contrary to the popular belief, rice consumption in these countries is fairly elastic and normally responds readily to changes in the price level. At the present time, however, the effect of low prices in facilitating the movement of the surplus from the great exporting regions is counteracted by conditions in the chief importing countries.

Net imports into principal Asiatic countries of deficit
(million pounds milled rice).

YEAR	China	Netherlands East Indies	British Malaya	Ceylon
1930	...	...	...	1,067
1929	1,439	1,506	1,263	1,108
1928	1,683	1,234	1,186	1,099
1927	2,799	1,013	1,228	1,057
1926	2,489	1,320	1,067	1,038
1925	1,679	1,109	907	976
1924	1,753	908	880	883

Probably the largest rice-consumer is China. In recent years it has obtained most of its imported supplies from French Indo-China and Siam, largely through Hong-Kong; this year, however, the larger export surplus in Burma, together with the reduced demand in that country's usual markets, has brought about an influx of Burmese rice into the Chinese market, facilitated by the reduction of Burma's export duty by 25 %. Competition in South China between the three great exporting countries is thus exceptionally severe. On the other hand, not only is South China, where rice occupies up to 70 % of the cultivated land, reported to have had a very good crop this year, but, in addition to the disturbance to purchasing power caused by recent political conditions, purchases from foreign countries are hindered by the slump in silver, which in January 1930 was 21d. per standard ounce in London, and, having declined sharply in the middle of 1930, underwent a further heavy fall at the end of that year and on 11 February 1931 reached the minimum price of 12d. The repercussion on the imports of a country retaining a silver currency could not but be serious. The silver dollar has now less than half its normal purchasing-power and, with the prospect of further sales of silver by various Governments engaged in demonetising that metal, is likely to fall in value still further. All three of the great rice-exporting countries are on the gold-exchange standard and are thus affected by the fall of the silver dollar and by the losses in savings experienced by Oriental peoples as a whole through the decline in value of silver. Siam is particularly severely affected owing to the relatively high exchange value of the baht as compared with the piastre and the rupee, and has felt very acutely the growth of Burmese competition in the Chinese market.

In British India it is estimated that about one-third of the population consumes rice. The deficit regions naturally depend mainly on Burma to supply their wants, rice from foreign countries having to pay import duty. The total amount of rice taken by India fluctuates greatly according to local harvests. In British India as a whole (including Burma) crop areas are fairly constant and rice is no exception, area under the crop having remained very steadily during the last decade round about 70 million acres, though a slight downward trend is noticeable.

In the five years ending 1928-29 Bengal accounted for 24.2 % of the total, Bihar and Orissa for 16.8 %, and Madras for 13.1 %. The area under rice in 1930-31 has been greater than in 1929-30 in Bengal and Madras but smaller in Bihar and Orissa. In British India as a whole the area is considerably greater than last year, though less than in the 1928-29 maximum, and the 1930 monsoon was on the whole normal, so that production shows an increase of 1.5 % on last year and 3.4 % on the mean of the quinquennium ending 1928-29.

Production in certain provinces of British India

(million pounds milled rice).

YEAR	Bengal	Bihar and Orissa	Burma	Madras	All-India (1)
1930-31	20,617	12,575	11,364	11,274	70,771
1929-30	18,372	13,465	11,169	11,771	69,733
1928-29	21,692	12,517	10,844	11,641	71,980
1927-28	14,544	9,807	10,945	11,386	63,244
1926-27	16,475	10,725	11,451	10,622	66,483
1925-26	18,408	10,951	10,624	11,021	68,851
1924-25	17,273	13,492	11,350	10,994	69,601

(1) The all-India statistics exclude the production of the Punjab, the North-West Frontier Province, Ajmer-Merwara, Manipur Pargana, and certain other Indian States, which together produced 2,336 million pounds on the average of the five years ending 1928-29; they also exclude the production of the feudatory states of Bihar and Orissa, for which no reliable data are available.

Production this year is estimated to have been 12 % greater than in 1929-30 in Bengal, due mainly to a very considerable increase in average yield as compared with last year, area having increased relatively slightly ; in Bihar and Orissa, where area was lower and rainfall at the close of the season was excessive in some districts, production is expected to be 7 % lower than last year though 10 % above the quinquennial mean ; in Madras, where the main crop had already been harvested in most districts in February, production is estimated to be 4 % smaller, 4 % increase in area having been offset by rain and flood damage in a number of districts.

In all these areas, as elsewhere in India, the quality of home-grown rice is in any case preferred to that of Burmese rice so that with a satisfactory production of the former a reduction in the demand for the latter may be expected. The general trade depression, too, has had a serious effect on Indian purchasing-power, dependent as that so largely is on certain agricultural export staples, the fall in the prices of which has been the heaviest so far experienced. In many parts of India this year it is also probable that the demand for rice will be seriously affected by the substitution of other food cereals, favoured by the exceptionally abundant crops of jowra and, in some areas, wheat.

The growth of rice imports into British Malaya has been intimately connected with the development of the plantation and tin industries in the peninsula, local labour being drawn away from rice cultivation to more remunerative occupations and a large immigrant population of rice-eaters being attracted from South China and Southern India. For Malaya as a whole imports of rice are therefore related very closely to the conditions in the rubber industry particularly. The acute depression in rubber now being experienced has, with the return of much immigrant labour to India, meant a decline in the rice-eating population, decreased purchasing power among those who remain, and a tendency to increase local production of rice. British Malaya normally relies mainly on supplies of rice from Burma, so that reduced demand in this market has been one of the factors stimulating Burma to look further afield for outlets.

Of practically the same importance as an importer are the Netherlands East Indies, where in recent years there has been a tendency for French Indo-China to gain relatively to Burma as a source of supplies. Here, too, prices of export crops have been very low, and the 1930-31 rice crop is reported to be rather above the average.

Similar considerations apply to Ceylon, which, despite the fact that rice is the principal native crop, is next in importance as a rice importer.

Sources of supply of Japan

(million pounds milled rice).

YEARS	Production			Net import from foreign countries into Japan (1)
	Japan	Korea	Formosa (first crop, June-August)	
1930-31	20,996	6,048	1,095	287
1929-30	18,709	4,305	896	394
1928-29	18,945	4,245	1,004	518
1927-28	19,510	5,435	1,022	1,278
1926-27	17,465	4,807	890	748
1925-26	18,757	4,641	997	1,671
1924-25	17,961	4,153	868	1,073

(1) Data refer to calendar years.

In Japan weather conditions this year have been unusually favourable and production shows an increase of over 12 % on that of 1929-30. The average annual increase in the rice area is, however, quite insufficient to meet the demands of the rapidly growing

population. There is little suitable unoccupied land still available and yields per unit area are already high. The normally increasing deficit in Japan's home crop is met as far as possible by imports from Korea and Formosa. Korea has this season had a record crop while Formosa's first crop (June-August), which is that exported to Japan, also shows a further increase this year. On the basis of a population of 65 million and an average per capita consumption of 112 shō (353 lbs.) the needs of Japan are now about 23 million pounds, so that the deficit on the 1930-31 domestic crop is about 2 million pounds, an amount greatly exceeded by the surpluses available this year in Korea and Formosa. In addition the stocks held by the Government must be taken into account. Though, as in Java, finer rice is sold for export by many growers who buy cheaper foreign qualities, the demand for foreign rice, normally supplied chiefly from French Indo-China, is likely to be exceedingly small this year, even assuming that an embargo is not placed on imports.

Production in the Philippines does not meet requirements and there is an import from French Indo-China and Siam. Here, too, the depression in prices of the chief exports may be expected to affect imports.

The demand for rice in non-Asiatic countries, whether for industrial purposes or for human consumption, is relatively insignificant and has little or no effect on the rice market. Amongst Latin-American countries the principal importer is Cuba. The very serious depression in the sugar industry, resulting in much unemployment and very low wages, may also be expected greatly to diminish the rice import.

Production and net export of minor exporting countries
(million pounds milled rice).

YEAR	Production			Net export		
	Italy	Spain	U. S. A.	Italy	Spain	U. S. A. (1)
1930	975	492	1,149	432	...	186
1929	1,010	469	1,123	357	86	284
1928	947	448	1,201	393	131	253
1927	1,043	478	1,243	550	118	188
1926	1,019	494	1,159	389	142	36
1925	962	472	925	341	99	28
1924	886	456	902	360	116	85

(1) In the figures for net export of the United States broken rice is not included.

For Europe Burma is the chief source, followed by French Indo-China and Siam. There are also imports of finer varieties from Bengal and Java. Amongst European producers Italy and Spain are exporters, largely to South America. Production in Italy this year is estimated to be smaller than in 1929-30 and in Spain slightly larger. In the United States, which has recently competed more strongly in the European market, there is also a small increase in production.

The first quarter of 1931 shows a continuance of the downward trend of prices that has characterised the last three years. The principal interruption in the general downward tendency was in the third quarter of 1929, prices rising to a relatively high level in October of that year, mainly due to a series of fortuitous occurrences causing a temporary scarcity in some of the Asiatic importing regions and to an improved demand in Europe. In 1930 the general slump in prices was shared by rice, though the fall in rice was less than in the case of other food grains, rice prices at the end of the year having fallen by only one-third with respect to the beginning of the year, while prices of other food grains fell by one-half. At present, with estimates of a good and in some cases exceptionally large crop in the principal rice-growing countries, whether exporters or importers, large crops of other food grains — particularly of wheat and millets — and accentuated trade depression in the principal rice-consuming countries, there seems an absence of any re-

THE PRICE SITUATION AND THE GENERAL OUTLOOK
Average Prices of Asiatic Rice on the London Market
 (shillings and pence per 112 lb.)

PERIOD	Burma N° 2	Siam Garden N° 1	Saigon N° 1
First quarter 1928.	14/2	15/7	13/4
" " 1929.	13/1	15/3	13/2
" " 1930.	11/4	14/-	11/10
Second " 1930.	12/-	15/7	12/5
Third " 1930.	11/5	14/10	11/7
Fourth " 1930.	9/1	10/5	9/7
January . . . 1931.	8/1	10/1	7/11
February . . . 1931.	7/6	9/5	7/10
March 1931.	7/9	9/5	7/11

lieving element in the situation. The further outlook for rice in the great exporting countries is rather disquieting. On the one hand the rice-consuming countries of monsoon Asia are seeking to extend their rice area and to increase their yields per unit area; on the other hand there is a tendency, noticeable in both China and India, especially in years of low wheat prices, for the consumption of that grain to increase at the expense of that of rice.

C. J. R.

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Yugoslavia : According to a definitive estimate production in 1930 was 50,000 centals (111,000 bushels), 4.5 % above that of last year and 26.1 % above the average of the five years ending 1928.

United States : According to the statement of farmers' intentions to plant as on March 1, the rice area for 1931 should be 97.1 % of the area harvested last year, which was 960,000 acres. Intended increases of 6,000 acres in Texas and 15,000 acres in California do not offset the intended decrease of 10 % or nearly 50,000 acres in Louisiana, although past experience suggests that the latter reduction may not be more than 30,000 acres.

Given average yields production would be about 18,225,000 centals (40,500,000 bushels) against 18,572,000 centals (41,271,000 bushels) produced last year.

On about April 2, rice planting had been well begun in Louisiana but there were complaints of slow growth due to cold weather.

India : Preparation of land for paddy in Bengal made progress during March and sowing was begun but the weather was dry during the latter part of the month and rain was needed to facilitate these operations.

Indo-China : In Tonkin the 1930 crop of the tenth month has given good yields and output is appreciably higher than in, preceding years. Late varieties, which suffered from drought at the end of the season, have given very satisfactory yields despite a certain proportion of empty grain.

In Annam the crop of the second half-year seems to be below the average; in the north it has been everywhere deficient; in the north-centre floods have caused losses in the low-lying areas; in the south-centre yields have been average for rice of the eleventh and twelfth months; finally, in several districts of the south rice of the eleventh and twelfth months has suffered from the floods and the preceding drought and yields are poor. Sowings of rice of the third month have in general a not very satisfactory appearance; transplantings have in many cases been retarded and otherwise deleteriously affected by flooding or drought.

In Cochín-China the harvest of early rice was generally good; the main crop also on the whole has given good yields.

The crop has been equally satisfactory in Cambodia, thanks to the rains at the end of the year.

In Laos rice on the plains has given good yields though inferior to those of 1929.

Taking a general view of the situation, it may be said that the total crop of Indo-China for 1930-31 has very probably been greater than that of last year, which was roughly 132 million centals (294 million bushels), itself above the average of 131.8 million centals (293 million bushels).

POTATOES

Belgium : Early potatoes have been planted under favourable conditions.

Irish Free State : Weather during the greater part of March favoured outdoor work. The bulk of the actual planting remains, however, to be done.

France : The good weather in the latter part of March in all districts except in the southwest, where the rain persisted till April, enabled preparation of the land to be carried out under good conditions. The first plantings were satisfactorily carried out.

In Northern Ireland planting has begun.

Great Britain and Northern Ireland : In England and Wales at the end of March preparation of the land for planting was well in hand under favourable conditions and some planting of earlies had taken place, though this work is generally rather backward.

Hungary : At the beginning of April planting of early varieties was begun, particularly on sandy soils.

Poland : The final estimate of production of potatoes in 1930 is 681,282,000 centals (1,135,447,000 bushels) compared with 699,965,000 (1,166,585,000) in 1929 and 543,035,000 (905,040,000), the average for 1924-28. Percentages: 97.3 and 125.5.

United States : According to a statement of farmers' intentions to plant this spring made by the United States Department of Agriculture, the area planted with potatoes should be 110.7 % of that grown for harvest in 1930, which was 3,394,000 acres. Allowing for average loss of plantings from drought, floods, blight, etc., the probable acreage for harvest in 1931 is indicated to be about 3,680,000 acres which would be about 8.4 % larger than the acreage harvested in 1930. A recent rise in the price of potatoes encouraged planting of this crop.

Mexico : During February potato planting was finished under good conditions in the producing areas of the States of Puebla, Mexico and Tlaxcala.

Algeria : Growth of early potatoes has been helped by fine weather, warmth and sunshine in March, especially towards the end of the month.

Digging results were rather poor at first but are now normal. Towards the beginning of April rain was desirable in some elevated areas, as winds had dried up the soil.

Union of South Africa : Due to the disappointing prices obtained for the 1929-30 crop and the droughty conditions prevailing during the early part of the present season, the total production is expected to be smaller than last season. Fairly extensive and belated plantings were made subsequent to the breaking of the drought in December-January; these will be marketed from April until the following spring. It is generally considered, however, that there will be less potatoes available during the later winter months than during the corresponding months in 1930.

SUGAR SEASON

We publish this month the first approximate estimates of the area to be cultivated to sugar-beet in European countries. The table has been compiled partly on the basis

of data supplied directly by the governments or sugar associations of the countries concerned in answer to our enquiry initiated in March. Where direct information is lacking we have availed ourselves of trustworthy private sources wherever possible. For those countries adhering to the Chadbourne plan, namely, Belgium, Czechoslovakia, Germany, Hungary, and Poland, account has been taken of the influence on the production programme, and consequently on sowings, of the export quotas established, in conjunction with the stocks position and the probable internal consumption.

It must be emphasised that these first estimates have a value mainly approximate, especially this year, when the spring, and consequently sowings, have been delayed, thus rendering the present estimate still more premature. However, as a general view of the situation, the data may be taken as sufficiently near the truth.

As was easily foreseen for reasons well known, almost all the European beet-growing countries are decreasing their beet area, the only important exceptions being Austria and Spain. We have already been pointed out that the increase in Austria is for the purpose of covering internal demand and is all the more assured since the growers are well satisfied with the price agreement reached. As regards Spain the Committee of Information on Agricultural Production has notified the Institute that there will be an increase in beet area of probably 15 % as compared with last year, since with low prices, for cereals and fodder crops, the cultivators are inclined to grow sugar-beet on a larger scale. Another important factor in the prospective development is the construction now proceeding of seven new factories, which will probably begin operations in the next campaign. For all other countries excepting Finland and Switzerland, which, however, have not great weight as producers, a decrease is expected.

Acreeage of Sugar Beet.

COUNTRIES	1931	1930	Average 1925 to 1929	% 1931	
				1930 = 100	Average = 100
	Acres	Acres	Acres	%	%
Germany	651,000	1,183,623	1,062,529	80.0	90.0
Austria	101,000	80,000	61,846	114.0	164.0
Belgium	119,000	137,311	162,316	86.0	73.0
Bulgaria	37,000	48,789	34,622	76.0	107.0
Denmark	79,000	84,000	92,907	94.0	85.0
Spain	240,000	208,960	182,438	115.0	131.0
Irish Free State	12,000	14,389	14,211	86.0	87.0
Finland	3,500	3,090	5,296	112.0	65.0
France	620,000	679,480	583,647	91.0	108.0
Great Britain	300,000	348,364	165,415	85.0	179.0
Hungary	151,000	184,548	167,859	82.0	90.0
Italy	264,000	277,575	224,800	95.0	118.0
Latvia	7,000	5,900	—	125.0	—
Netherlands	94,000	141,994	157,114	66.0	60.0
Poland	408,000	457,000	510,170	80.0	80.0
Rumania	100,000	120,948	106,863	82.0	59.0
Sweden	88,000	96,520	77,988	90.0	111.0
Switzerland	3,600	3,040	3,657	104.0	86.0
Czechoslovakia	520,000	613,755	674,076	85.0	77.0
Yugoslavia	120,000	147,798	110,277	84.0	112.0
<i>Total Europe . . a)</i>	<i>4,215,600</i>	<i>4,856,084</i>	<i>4,458,125</i>	<i>87.0</i>	<i>94.0</i>
U. S. S. R.	3,346,000	2,523,000	1,626,378	132.0	206.0
<i>Total Europe . . b)</i>	<i>7,561,600</i>	<i>7,379,084</i>	<i>6,084,498</i>	<i>102.0</i>	<i>124.0</i>
Canada . . . . .	...	52,511	45,854	...	...
United States . . . . .	...	800,255	681,218	...	...

a) Not including the U.S.S.R. — b) Including the U.S.S.R.

programme of the Five Year Plan, the increase in area in that country in comparison with last year will be sufficient to compensate for the decrease in other countries and to bring about an increase on the whole of 2 % in comparison with 1930 and of 24 % in comparison with the mean of the five years ending 1929.

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France : Preparation of the land has been effected under good conditions thanks to the fine weather that prevailed in the beet region in the latter part of March. At the beginning of April sowings had begun in some districts, but growers were generally awaiting the decisions of the sugar factories and distilleries.

Great Britain and Northern Ireland : Preparation of land intended for sugar-beet was generally rather backward at the end of March.

Hungary : Preparation for sowings was in progress in the early part of April, and sowing had already begun here and there.

Italy : The prevalently rainy weather and the excessive humidity of the soil have rather hindered operations, but sowing has been begun.

India : In Bihar and Orissa standing crops of sugar cane are in good condition.

Production of Cane Sugar.

COUNTRY	1930-31 (1)	1929-30	Average 1924-25 to 1928-29	1930-31 (1)	1929-30	Average 1924-25 to 1928-29	Percentages for 1930-31	
							1929-30 = 100	Average = 100
	Thousand centals			Short tons			%	
AMERICA.								
Argentina	8,416	7,506	8,406	420,780	375,310	420,800	112.0	100.0
Brazil	11,464	13,217	16,786	573,196	660,829	539,310	87.0	138.0
Cuba	69,933	104,630	106,760	3,496,640	5,231,437	5,337,420	67.0	65.0
Ecuador	410	420	431	20,500	21,008	21,580	98.0	95.0
United States (Louisiana)	4,157	3,992	1,911	207,850	199,009	95,576	104.0	217.0
Jamaica	1,889	1,449	1,242	69,000	72,460	62,103	96.0	112.0
Mexico	5,401	4,713	4,111	270,000	235,700	205,630	115.0	131.0
Peru	9,239	9,308	7,518	450,000	465,405	375,910	99.0	123.0
Porto Rico	15,581	17,307	12,897	779,047	865,352	644,827	90.0	121.0
Dominican Republic	7,392	8,064	7,680	369,600	403,200	379,000	92.0	97.0
Total, America	133,402	170,606	167,632	6,666,013	8,630,310	8,381,535	73.0	80.0
ASIA.								
Formosa	17,506	17,868	12,169	875,263	893,396	606,450	98.0	144.0
India	71,187	61,846	65,001	3,559,400	3,092,300	3,296,000	115.0	97.0
Japan	2,641	2,318	2,198	132,100	115,909	109,920	114.0	120.0
Java	65,455	64,838	51,086	3,272,681	3,241,864	2,554,268	101.0	128.0
Philippine Is.	17,417	17,858	15,587	870,000	890,000	779,000	98.0	112.0
Total, Asia	174,206	164,728	146,941	8,709,444	8,233,469	7,346,638	106.0	119.0
AFRICA.								
Egypt	2,370	2,368	2,019	118,500	118,402	101,000	100.0	117.0
Mauritius	4,841	5,248	4,962	242,065	262,886	249,100	92.0	97.0
Reunion	1,102	1,117	1,122	60,000	55,854	56,100	99.0	98.0
Union of S. Africa	7,860	5,973	4,748	393,000	296,635	237,390	132.0	165.0
Total, Africa	16,173	14,706	12,871	813,566	735,277	643,690	110.0	126.0
OCEANIA.								
Australia	11,818	11,833	10,843	591,000	594,000	542,000	99.0	103.0
Hawaii	18,298	18,320	16,746	910,000	916,000	837,300	100.0	109.0
Fiji Is.	1,964	1,971	1,895	99,200	98,500	94,730	101.0	105.0
Total, Oceania	32,095	32,174	29,484	1,600,200	1,608,500	1,474,030	100.0	109.0
General Totals	355,576	362,214	356,926	17,783,222	19,107,556	17,845,793	93.0	100.0

(r) Approximate data.

Indo-China : The crop has been good in Tonkin and is reported to be satisfactory in Annam.

Turkey : The sugar-beet crop in Thrace was so abundant that the Alpoulou factory was unable to utilize all of it, though its capacity had been increased.

Algeria : At the end of March preparations for sowing were being made. To encourage the spread of the crop the agricultural department has made a free distribution of seed.

Egypt : Weather has been favourable for planting, shooting and growth. In Qena and Assuan preparatory cultivations have been completed on 60 % of the cane area, and in the other provinces have been begun and are in active progress.

Development of the two-year crop is satisfactory. Cutting of the old crop is completed, yield being 2 % above the average. Crop condition on 1 April was 102, as on 1 March, against 103 on 1 April 1930.

It is expected that the area cultivated this year will be greater than last in consequence of the agreement reached between the industry and the Government and of the reluctance of the cultivators in Upper Egypt to grow cotton.

Union of South Africa : Weather in February over the sugar belt was exceptionally hot and dry and cane was reported to be dying in certain parts of Zululand.

Australia (Telegram of 8 April) : The crop has been retarded and is expected to be below that of last year.

VINES

Austria : On 1 April crop condition was 2.4 against 2.3 on 1 March this year and 2.1 on 1 April 1930.

France : The situation in the south continues to be good ; growth is satisfactory and budding has been normal and vigorous. Pruning has been completed under good conditions and cultivation carried out satisfactorily. Towards the beginning of April beneficial rains fell in the vine area as a whole, so that soil moisture is plentiful. Some losses due to flooding or to caterpillars are reported in certain vineyards.

In the south-western districts the situation was less satisfactory ; rainy weather persisted up to the beginning of April, delaying pruning and other work. The warmth of the second week of April stimulated rapid budding. In Alsace the situation is similar, while that in the west and centre has ameliorated.

The vines are now at the critical period of late frosts.

Up to the beginning of April a decline in prices for lower quality wines was experienced, but at that date appeared to have been arrested. A slight recovery of business is reported.

Italy : Hoeing has proceeded only slowly, owing to the adverse weather. The buds are large.

Turkey : Abundant rains fell in Smyrna during the first half of April, accompanied by north winds. This weather was unfavourable to vines and the price of raisins has increased notably.

Algeria : Wines improved considerably in March ; sunny weather, interrupted towards the middle of the month by heavy showers and warm, sunny weather during the whole of the latter half of the month were very favourable. Growth was rapid and vigorous ; formation of buds is normal these being large and numerous.

ceding five seasons ; percentages : 85.5 and 84.0. Production is estimated at 1,667,000 centals (349,000 bales) against 2,036,000 (426,000) and 1,984,000 (415,000) ; percentages :

Fine weather permitted cultivation and baring to continue until the end of March in the departments of Algiers and Constantine ; moulding up has been effected in the department of Oran.

The dampness of the soil and the warmth gave rise to fears towards the end of March, of an attack of mildew ; the first treatment was applied, the weather favouring this operation. The appearance of *haltica* is reported in the Department of Oran.

French Morocco : Work in the vineyards has been carried out under very good conditions. Soil humidity is satisfactory. At the end of March opening of the buds was progressing rapidly, though more warmth and sunshine would be desirable.

Extension of vine-growing in certain districts of western Morocco is reported.

OLIVES

Greece : According to a telegram of April 18 received from the Ministry of National Economy, the production of olive oil in the season 1930-31 is 1,937,000 centals (25,450,000 Am. gallons) against 1,633,000 (21,459,000) in the season 1929-30 and 1,769,000 (23,246 000), the average for the preceding five seasons ; percentages : 118.6 and 109.5.

Italy : Owing to excessive rains hoeing proceeded only slowly. Flowering has begun.

In the following table are given the data for area and production of olives and oil in 1930, compared with those of the preceding year and the mean of 1924-28.

Products	1930-31	1929 30	1924-25	1929-30=100	% 1930-31 Mean = 100
Mixed crop . (1000 acres)	4,163	4,152	4,252	100.3	97.9
Pure crop . (1000 acres)	1,415	1,427	1,422	99.2	99.5
Olives . . (1000 cent.)	16,840	37,935	26,050	44.4	64.6
Oil }	(100 cent.)	2,695	6,382	3,976	67.8
	(1000 Am. gal.)	35,411	83,869	52,244	

The yield of oil in 1924-28 was 15 lbs (2.0 Amer. gal.) per cental olives, 17 (2.2) in 1929 and 16 (2.1) in 1930.

French Morocco : Pruning was carried out under good conditions. Soil humidity is high.

COTTON

United States : A little cotton was planted in the South at the end of March but germination was slow and uncertain because of the wetness and low temperatures. In the second week of April cotton planting was progressing fairly well but germination was irregular.

Mexico : In the lake district and in the districts of Matamorca and San Fernando sowings began under normal conditions towards the end of February, the ground being sufficiently moist. In the producing districts of Veracruz, Oaxaca, and especially Guerrero crop condition is not very good owing to the lack of rain. In the Yaqui district preparation of the land began ; the area cultivated there is estimated to be lower than last year.

India : The most recent estimate of the cotton area in Madras in 1930-31 is 2,116,600 acres against 2,476,500 in 1929-30 and 2,520,300, the average for the preceding five seasons ; percentages : 85.5 and 84.0. Production is estimated at 1,667,000 centals (349,000 bales) against 2,036,000 (426,000) and 1,984,000 (415,000) ; percentages :

81.9 and 84.0. The seasonal factor for April is estimated at 94 compared with 95 at the corresponding period of last year. Picking is still proceeding.

On March 19th. the condition of the cotton crop in all India was reported to be fair.

Indo-China : In South Annam yields are average.

Egypt : The total area planted to cotton is estimated to be smaller than that of last year which was the largest on record in Egypt (2,162,000 acres). The reduction is due to the depression of cotton prices and to the rigid application of the law of 5-II-31 (Journal Officiel, 9-II-31, No. 13), which forbids the cultivation of Sakellaridis outside certain zones in the north of the Delta forming parts of the provinces of Beheira, Gharbiya and Daqahliya, and to an extent exceeding 40 % of the total area cultivated by each grower in those zones. This law, which is to remain in force until the end of the season 1932-33, that is, for three years, reduces the Sakellaridis area in Egypt to a maximum of 584,500 acres from 869,000 in 1930-31, of which 775,000 in the northern area of the Delta mentioned in the above law. Strict watch is kept on trade in Sakellaridis seed for sowing under the provision of a further law regulating the conditions under which growers are supplied with seed subject to the control and previous authorisation of the inspectors of the Ministry of Agriculture. Seed distribution, however, has taken place normally and without difficulty, thanks to financial assistance by the Government. Demand for seed of the other varieties has been naturally larger than in past years but seed distribution has nevertheless taken place normally.

Weather conditions in February and March have on the whole, been favourable to work of preparing the soil for the crops, to plantings, to germination and to development of the plants. In March temperatures were rather high, but fell sharply in the last ten days of the month and were accompanied in Lower Egypt by strong winds and damp night conditions. Crops in Lower and Middle Egypt are about a week earlier than last year. They are, on the contrary, late in Upper Egypt, where the areas planted up to the end of March amounted to hardly 30 % of those planted at the same date of last year due to the hesitation of small growers and because of the fact that some large proprietors have had to cultivate their lands at their own expense. Germination and growth of the plants in districts where crops have not been delayed, are on the whole, extremely satisfactory and the extent of re-planting varies from 2-4 % for the early crops. Work is proceeding rapidly on land not yet planted. Re-planting of early crops is beginning as well as row hoeing and irrigation. Water is not abundant this year and a shortage is expected in the summer ; canal levels are therefore low and in many districts pumps are needed to raise the water. Drainage conditions are good.

(Telegram of 16 April) : The amount of cotton ginned from 1 September 1930 to 31 March 1931 was as follows, in comparison with the corresponding amount on 28 February 1931 and 31 March 1930 and 1929.

Variety		31/III/31	28/II/31	31/III/30	31/III/29
Sakellaridis	(1000 cent.)	1,558	1,442	2,330	2,249
	(1000 bales)	326	302	488	471
Other varieties	(1000 cent.)	4,619	4,306	5,088	4,947
	(1000 bales)	966	901	1,064	1,035
Total lint	(1000 cent.)	6,177	5,748	7,419	7,196
	(1000 bales)	1,292	1,202	1,552	1,506
Linters	(1000 cent.)	149	139	175	208
	(1000 bales)	31	29	37	44
Total lint and linters	(1000 cent.)	6,326	5,887	7,594	7,404
	(1000 bales)	1,323	1,231	1,589	1,550

Anglo-Egyptian Sudan : The latest provisional estimate of production is 542,000 centals (113,500 bales) of ginned cotton against 665,000 (139,200) in 1929-30 and 508,000 (106,300), the average of the preceding five seasons ; percentages : 81.5 and 106.8.

FLAX

France : Preparation of the land, sowing and sprouting have taken place under good conditions, thanks to good weather in the latter half of March. It would seem, however, that there has been a considerable reduction in the area under cultivation.

Great Britain Northern Ireland : It is expected that there will be a smaller acreage in Northern Ireland this year.

Hungary : Sowings commenced at the beginning of April.

Poland : The flax area in 1930 was 285,000 acres compared with 289,000 in 1929 and 271,000, the average of 1924-28 ; percentages : 98.6 and 105.2. Production of linseed in 1930 was 1,308,000 centals (2,335,000 bushels) against 1,731,000 (3,092,000) in 1929 and 1,321,000 (2,360,000), the average of the preceding five years ; percentages : 75.5 and 99.0. Production of fibre in 1930 was 973,000 centals against 1,448,000 in 1929 and 1,110,000, the five year average ; percentages : 67.2 and 87.7

United States : The statement of farmers' intentions to plant this spring communicated by the Department of Agriculture gives the area of linseed for 1931 as 95.9 % of the area harvested last year, which was 3,946,000 acres. It should be noted that, during the past two years, abandonment of flax has been relatively heavy in the Dakotas and Montana, and that abandonment varies greatly from year to year. With average yields the intended acreage would produce a little over 16,000,000 centals (28,000,000 bushels) which would be about 3,000,000 centals (5 million bushels) below prospective requirements for the 1931-32 flax season.

India : In Bihar and Orissa variable light to heavy rains fell during the first part of March but precipitation diminished in quantity in the latter part of the month. At the end of March crops were in good condition.

On March 19th it was reported, for all India, that seasonal conditions of the linseed crop had not been quite favourable ; the condition of the crop was, on the whole, reported to be fairly good.

According to the second report the flax area for 1930-31 is 2,299,000 acres against 2,332,000 in 1929-30 and 2,810,000, the average for 1924-25 to 1928-29 ; percentages : 98.6 and 81.8.

Palestine : Northern Palestine : flowering is over and the seed has set. Heavy yields are expected. In Southern Palestine linseed is grown only on demonstration plots. The crop is looking well and coming into flower.

Egypt : Weather favoured growth and ripening, though wind caused some shedding of flowers in Giza province. The crop is approaching maturity. In late-sown areas seed formation has begun. Crop condition is satisfactory.

TOTALS OF WORLD AGRICULTURAL PRODUCTION

The following totals have been obtained from the data in the tables published for each product in January, which have been revised and completed. With the name of each product is indicated the number of countries for which data for 1930 are at present available and also the percentage of their total production in 1929 to world production in the same year as published in the 1929-30 Yearbook, when they comprised nearly all producing countries except China.

Crop, number of countries comprised in the total, and percentages of world production	AREA						PRODUCTION							
			Average 1924 to 1928	Percentages for 1930 and 1930-31		BRITISH WEIGHTS			AMERICAN WEIGHTS			Percentages for 1930 and 1930-31		
	1930	1929		1929 and 1930-31	Average 1929-1930 = 100	1930 and 1930-31	1929 and 1929-30	Average 1924 to 1928 and 1924-25 to 1928-29	1930 and 1929-30	Average 1924 to 1928 and 1924-25 to 1928-29	1929 and 1929-30 = 100	Average 1929-1930 = 100		
	and 1930-31	and 1929-30	1924-25 to 1928-29											
	thousand acres	thousand acres	%	%	thousand centials	thousand centials	thousand centials	thousand bushels (60 pounds)	thousand bushels (56 pounds)	%	%			
Wheat (50 countr. 100.0 % . . . a)	247,541	241,010	231,423	102.7	107.0	2 221,496	2,078 240	2,115,726	3,707,419	3,463,732	3,526,140	107.0	105.1	
Rye (31 countries 100.0 % . . . a)	48,608	47,279	46,862	102.0	103.0	557,989	562,083	497,874	996 322	1,004,794	880,063	99.2	112.1	
Barky (43 countr. 93.0 % . . . a)	61,180	62,921	54,243	97.2	112.8	699,403	728,870	603,368	1,457,116	1,518,089	1,257,038	96.0	115.9	
Oats (40 countries 99.0 % . . . a)	103,900	102,706	104,572	101.2	99.4	1,168,002	1,194,910	1 172,197	3,651,854	3,784,086	3,663,091	97.8	99.7	
Maize (20 countries 81.0 % . . . a)	141,678	141,445	140,216	100.2	101.0	1,556,998	1,930,600	1,871,193	2,780,361	3,463,597	3,441,425	80.3	83.2	
Rice (rough) (11 countr. 83.0 % . . . a)	108,699	107,028	107,389	102.5	102.2	1,086,104	1,502,487	1,383,985	3,747,022	3,559,678	3,519,896	105.9	106.5	
Potatoes (33 countr. 96.0 % . . . a)	29,925	30,212	29,827	99.1	102.0	3,192 763	3,340,008	2,895,962	5,321,165	5,566,569	4,826,307	95.6	110.2	
Sugar-beet (22 countr. a) 23 countries 94.0 % b)	5,508	5,219	5,076	105.5	108.5	1,380,889	1,105,679	1,085,549	69,044	55,283	54,277	123.1	125.4	
Cotton (11 countr. a) 13 countries 87.0 % b)	71,849	73,883	72,054	97.2	98.5	97,198	100,994	104,246	84,765	62,170	62,656	136.3	134.6	
Linseed (19 countr. 99.0 % . . . a)	15,990	13,112	14,701	122.0	108.8	70,017	52 825	72,012	125,030	93,973	128,593	133.0	97.2	
Flax (flbre) (16 countr. 94.0 % a)	983	1,055	1,018	93.2	96.6	990	4 877	4,564	389,999	487,664	456,356	80.0	85.5	
Hemp (flbre) (7 countr. 60.0 % . . . a)	346	363	353	95.2	97.9	2,833	2,851	2,065	284,295	285,059	296,523	99.4	95.5	
Tobacco (13 countries 75.0 % . . . a)	3,025	2,083	2,592	103.1	116.7	25,289	24,105	22,730	2,528,031	2,410,542	2,272,974	104.9	111.3	
Hops (4 countries 89.0 %)	126	143	126	87.0	100.0	1,100	1,463	1,155	110,011	149,253	115,523	73.7	95.2	
Olive oil (7 countr. 94.0 %)	—	—	—	—	—	8,170	24,791	14,758	107,363	925,768	193,926	33.0	55.4	
Vines (15 c. 87.0 %)	—	—	—	—	—	(1)2,758,055 (1)3,431,552 (1)3,162,258	(1)3,313,257 (1)4,120,965 (1)3,707,587	(1)3,313,257 (1)4,120,965 (1)3,707,587	(1)3,313,257 (1)4,120,965 (1)3,707,587	(1)3,313,257 (1)4,120,965 (1)3,707,587	(1)3,313,257 (1)4,120,965 (1)3,707,587	80.4	87.2	
Silks (7 c. 99.0 %)	(2) 7,626 (2) 7,834 (2) 7,397	(2) 7,626 (2) 7,834 (2) 7,397	(2) 7,626 (2) 7,834 (2) 7,397	97.3	104.1	(3)1,052,779 (3)1,014,236 (3) 862,804	(3)1,052,779 (3)1,014,236 (3) 862,804	(3)1,052,779 (3)1,014,236 (3) 862,804	(3)1,052,779 (3)1,014,236 (3) 862,804	(3)1,052,779 (3)1,014,236 (3) 862,804	(3)1,052,779 (3)1,014,236 (3) 862,804	103.8	122.0	

a) Not including the U. S. S. R. - b) Including the U. S. S. R. - (1) Wine. - (2) Eggs in incubation. - (3) Cocoons.

OTHER PRODUCTS

Tea.

Ceylon : During March the weather was dry, but tea was not damaged and crop condition on April 1 was average.

India : According to a report dated March 19th received from the Government of India weather conditions in North India were variable, some districts recording too much rain and others too little ; in South India conditions were generally seasonable but lack of rain affected crop prospects which could only be described as poor.

In North India no crop was harvested during the month of February. The outturn in South India during February was slightly behind that for the corresponding month of last year.

Indo-China : In Tonkin yield has been poor but the quality of the tea prepared is very good.

Coffee.

Mexico : Picking was completed in Veracruz, Chiapas, and Oaxaca in February, the crop being generally below that of last year owing to the prolonged drought in August and September.

Indo-China : In Annam the crop has, according to district, been very satisfactory or fairly satisfactory. Anthracnosis and corticium have caused serious losses in the north-centre, while in northern Annam drought has hindered vegetation and the development of young bushes planted in the winter of 1929-30.

Gold Coast : In March dry weather favoured transport of the major crop from distant localities to marketing centres. Selling was general and very little was left in growers' hands at the end of the month. The quality of the beans leaving the ports is fairly good, shipments by steamer during March being rather above the average. Crop movement is abnormally heavy and exceeds previous March records. Shipments by steamer during the month were 41,660 long tons (933,200 centals) against 24,350 (545,400) the average of the last four years. The amount shipped from all ports from 1 October to the end of March was 149,300 long tons (3,344,300 centals) against 172,600 (3,866,200) the four-year average. The quantity arriving by rail at Takoradi and Accra in March was 18,200 tons (407,700 centals) against an average of 7,325 tons (164,100 centals). The corresponding amounts for October-March were 110,000 (2,464,000) and 134,000 (3,001,600).

As regards the minor crop, it is reported that in the southern area young pods are progressing satisfactorily and that a normal crop is indicated.

Groundnuts.

United States : According to a statement of farmers' intentions to plant this spring made by the Department of Agriculture, the area of groundnuts for all purposes should be 30.7% larger than the 1,827,000 acres harvested in 1930. Intention is reported to increase the groundnut acreage in all States. States in which the Spanish and runner types are commercially important in the Southeast and Southwest report intended increases of about 38% above last year's acreages. An increase of about 10% is intended in the Virginia, North Carolina and Tennessee areas which grow large podded nuts. In the past, reports of intended plantings of groundnuts for the United States have been about 5% above acreages actually planted. Given average yields, production in 1931 would be

7 % higher than the record crop of 1929 for which growers received especially unfavourable prices. Carry over stocks, however, are expected to be the lowest in recent years.

Indo-China : A good crop has been obtained in Annam

Rapeseed and Mustard.

Austria : The short warm spell at the end of March favoured development of winter colza. Crop condition on 1 April was 2.9 against 2.8 on 1 March of this year and 2.3 on 1 April 1930.

Hungary : Winter colza has wintered well, though the cold weather in March checked development and sporadic frost damage occurred.

Poland : Crop condition of winter colza was estimated at 3.3 (according to the system of the country) on 1 April, 1931 against 3.4 on 1 April 1930.

The rapeseed area in 1930 was 65,000 acres against 58,000 in 1929 and 62,000, the average of 1924-28. Percentages : 111.9 and 104.4. Production in 1930 was 610,000 centals (1,210,000 bushels) compared with 522,000 (1,044,000) in 1929 and 535,000 (1,070,000), the average of 1924-28, percentages : 116.8 and 113.9.

India : According to the second report the rapeseed and mustard area for 1930-31 is 3,461,000 acres against 3,466,000 in 1929-30 and 3,310,000, the average for 1924-25 to 1928-29, percentages : 99.9 and 104.6.

In Bengal light to moderate rains fell at the beginning of March but in the remainder of the month weather was practically dry. Harvesting is almost over. At the beginning of April, the condition of standing crops was generally fair. In the Punjab rains were generally light to moderate in the first ten days of March, the weather subsequently becoming dry, some local damage was reported due to insects and hailstorms. The condition and prospects of irrigated crops are generally average to good and of unirrigated crops below the average to average. For Bihar and Orissa see "flax" in India.

Palestine : Northern Palestine : the land is being prepared. In Southern Palestine ploughing is in progress everywhere.

Jute.

India : Preparation of land for jute in Bengal made progress during March and sowing was begun but the weather was dry during the latter part of the month and rain was needed to facilitate these operations.

Tobacco.

Hungary : Plantations show active growth though somewhat checked by the cold.

United States : According to a statement of farmers' intentions to plant this spring made by the United States Department of Agriculture, the area planted with tobacco should be 99.3 % of that grown for harvest in 1930, which was 2,110,300 acres. The most significant changes are a decrease of 10 % in flue-cured tobacco and a 14 % increase in burley. Other changes are : Maryland tobacco, 15 % increase ; fire-cured tobacco, 2 % increase ; cigar filler, 1 % increase ; cigar binder, 2.5 % increase ; cigar wrapper, 7.5 % decrease.

The Department of Agriculture has recommended a greater decrease in acreage of flue-cured tobacco than is intended, due to the market situation. The outlook for burley is also viewed as unfavourable as it is intended to increase acreage by 19 % while actually a substantial decrease would be required to improve the outlook.

Korea : In 1930, 33,292,000 centals of tobacco were produced compared with 57,181,000 in 1929 and 36,590,000 on the average for 1924-28 ; 58.2 % and 91.0 %.

Palestine : Transplanting of seedlings is in progress.

Algeria : Preparation of the soil has progressed actively but conditions for the first plantings of tobacco have not been very good due to insufficient preparation of the soil.

It is estimated that tobacco plantings will be reduced this year ; some plantings have been destroyed and it has not been possible to prepare in time all the land reserved for this crop.

Hops.

Hungary : The cold prevented regular development.

Hemp.

Hungary : Preparation of the land was in progress at the beginning of April and sowings were begun.

Italy : Sowing has commenced.

Poland : The area under hemp in 1930 was 79,000 acres against 83,000 in 1929 and 72,000, the average of 1924-28 ; percentage comparisons : 95.0 and 110.0. Production of hempseed in 1930 was 487,000 centals against 545,000 in 1929 and the five year average of 396,000 ; percentages : 89.2 and 123.0. Fibre production in 1930 amounted to 463,000 centals against 494,000 in 1929 and the average of 389,000 ; percentages : 93.6 and 119.1.

Sericulture.

France : According to the latest official enquiry the quantity of eggs incubated in 1930 is 43,400 ounces against 44,600 in 1929 and the average of 67,600 for 1924-28 ; (97.2 % and 64.2 %). There is a larger decrease in production as the quantity of fresh cocoons for 1930 is 3,975,000 lbs. compared with 5,591,000 in 1929 and an average for 1924-28 of 7,521,000 (71.1 % and 52.9 %). Silk worm rearing, which in post-war years showed considerable recovery, has experienced a more rapid regression since 1927.

FODDER CROPS

Germany : Vegetation is still entirely at a stop in the meadows and pastures and also in the fields planted with clover and with lucerne. Clover has suffered greatly from the winter.

Austria : Clover has generally wintered well. In some districts, however, field-mice have caused considerable damage. At the beginning of April the greater part of the meadow and pasture land was under snow.

Crop condition at the beginning of April was as follows : red clover 2.6 (against 2.7 on 1 March this year and 2.4 on 1 April 1930) ; lucerne 2.9 (2.8, 2.6) ; mixed clover : 2.5 (2.4, 2.4) ; mixed fodder and vetches 2.7 (2.7, 2.6) ; permanent meadows 2.7 (2.5, 2.6) ; pastures 2.9 (2.8, 2.8).

Belgium : The meadows and fields of young clover and alfalfa are greening again very slowly.

Irish Free State : Pastures remained bare during the greater part of the month except in more favoured districts and on lands top-dressed with manures for the early production of grass.

France : Fine, warm and sunny weather during the the latter half of March over almost the whole of the country improved the quality of grass so that meadows and pastures at present are providing plentiful and good nourishment. In the Southwest only the situation has not changed and the rain persisted until April.

The fine weather favoured field work and spring fodder crop sowings which were effected under good conditions, although a little late.

Grassland, which was in bad condition at the beginning of March due to the persistence of damp weather, recovered during the month thanks to the fine, dry weather and showed a more satisfactory appearance.

Great Britain and Northern Ireland : Though checked by the frosts and cold winds in the earlier part of the month, seeds were recovering and making progress at the end of March and were strong and healthy. There was a considerable improvement in conditions for outdoor work during the latter half of the month, when the weather was generally very favourable.

In Northern Ireland the condition of pastures is rather poor as there has been little growth so far.

Hungary : At the beginning of April preparation of the land for sowing of fodder beet was in progress. Clover and lucerne show slow development owing to the cold. Field mice have caused some damage to clover.

Owing to the cold, vegetation in the meadows and pastures has not yet begun.

Italy : There were abundant rains in March. In the first part of the month progress of vegetation was satisfactory, and in irrigated meadows quite luxuriant. In the latter part of the month sowings of catch-crops were commenced. Irrigated meadows have begun to yield hay and the output is plentiful. Meadows and pastures are in fair condition.

In the following table are given the definitive data of area and of production in 1930 of fodder crops in terms of ordinary hay, compared with the final figures for 1929 :

CROPS		1930	1929	% 1930 1929 = 100
<i>Area (thousand acres).</i>				
Temporary meadows	excluding those in 1st year of growth	4,337	4,273	101.5
	those in the 1st year of growth (new meadows)	1,448	1,223	118.4
	<i>Total</i>	<i>5,785</i>	<i>5,496</i>	<i>105.3</i>
Grass, mixed		1,367	1,317	103.8
Unirrigated permanent meadows		3,403	3,413	99.7
Irrigated permanent meadows		850	848	100.3
Permanent pastures		11,127	11,137	100.0
<i>Production.</i>				
Temporary meadows	excluding those in 1st year of growth. . (ooo centals)	230,454	206,023	116.2
	(ooo sh. tons)	11,973	10,301	
	those in 1st year of growth (new meadows) (ooo centals)	24,450	19,487	125.5
	(ooo sh. tons)	1,223	974	
	<i>Total</i>	<i>254,910</i>	<i>225,510</i>	<i>117.0</i>
	(ooo sh. tons)	<i>13,196</i>	<i>11,275</i>	
Grass	(ooo centals)	41,903	37,201	112.4
	(ooo sh. tons)	2,095	1,865	
Unirrigated permanent meadows	(ooo centals)	79,329	68,178	116.4
	(ooo sh. tons)	3,966	3,409	
Irrigated permanent meadows	(ooo centals)	56,569	52,719	107.3
	(ooo sh. tons)	2,828	2,636	
Permanent pastures	(ooo centals)	61,009	60,786	105.3
	(ooo sh. tons)	3,200	3,039	
Accessory fodder production	(ooo centals)	105,617	95,300	110.8
	(ooo sh. tons)	5,281	4,765	

Poland : At the beginning of April crop condition of clover according to the system of the country was 3.1 against 3.2 on the same date last year.

The area under clover in 1930 was 2,210,000 acres compared with 2,081,000 in the

previous year, an increase of 6.2 %. Production of clover hay in 1930 was 75,164,000 centals (3,758,000 sh. tons) against 79,088,000 (3,954,000) in 1929, a decrease of 5 %..

Switzerland : Toward the end of March the first grass showed little growth, even in the low-lying areas ; in the upland areas snow still covered the ground. Consequently the condition of permanent and temporary pastures is below the average of previous years. Besides, in various places rodents have caused important losses. At the beginning of April crop conditions of permanent and temporary pasture was, according to the system of the country, respectively 3.6 and 3.6 against 4.1 and 4.1 on the same date last year.

United States : According to a statement of farmers' intentions to plant this spring made by the United States Department of Agriculture, the area sown with tame hay should be 101.0 % of the 1930 harvested acreage which was 58,473,000 acres. Reductions in acreage are intended in most of the important clover and timothy producing States where drought in 1930 weakened or killed the meadows and new seedings. In the southern States of the drought area the intention is to increase the acreage of soya beans, cowpeas and peanuts. The intended increases in total acreage of the unmixed crop for hay and also for other purposes are : peanuts 30.7 % ; soya beans : 25.0 % and cowpeas : 29.2 %. These increases in the total acreage are largely intended for hay.

On the basis of past departures from intentions it is anticipated that the acreage of tame hay will be about 98.9 % of last year's harvested area or rather less than the reported intention of 101.0 %.

With average yields on the acreage intended production would be about 1,800 million cental (90 million short tons) compared with 1,653 million (83 million) last year. With an increased proportion of acreage of grain hay and annual legumes, particularly in the South, and with the known thin stands of clover and timothy in the North and Central States, average yields of all tame hay are more likely to be below than above the average.

Palestine : Northern Palestine : grazing on hill and plain alike is excellent. Good yields are expected from helba (fenugreek). The third cutting of bersim (clover) is developing well under favourable conditions. Vetch and oat mixture is developing well. Southern Palestine : grazing is fair in the northern areas, but becoming progressively poorer towards the South-East, where in some parts drought conditions with losses of stock more particularly new-born lambs and kids, are reported. Vetch and oats mixture is very well developed, and good yields are expected.

Algeria : During March, pastures, which had been thin at the beginning of the month owing to the cold, slowly recovered. Towards the middle of the month grass had still a high water content and was not very nutritive ; sunny weather in some days of the latter half of the month greatly improved the quality so that there is now plenty of good grass.

Egypt : Weather has been favourable to the growth and ripening of bersim. In Lower Egypt the third cutting is beginning and in Middle Egypt the fourth, while on the so-called " project " lands of Assiut the fifth cutting has begun. In the basin lands the second cutting is still in progress. Crop condition on 1 April was 99 as on 1 March last and on 1 April 1930.

French Morocco : The common lands, which up to the end of February showed little vegetation, have now recovered and pasture is at present abundant.

LIVESTOCK AND DERIVATIVES

Condition of Livestock and Dairy Production.

Belgium : Livestock are in good condition as regards health.

Irish Free State : Supplies of hay, straw, home-grown grain and roots at the end of March were reported in every district to be ample for all requirements up to the beginning of the grass season.

Owing to the inclement weather milk yields were slightly below the normal for the season.

France : Livestock at the end of the winter was fairly well supplied with feed and in rather good condition. The generally bad quality of last season's fodder crops however, is an obstacle to raising.

Great Britain and Northern Ireland : In England and Wales pastures were rather bare at the end of March, as grass made little growth during the month, but, though supplies of winter keep were heavily drawn upon, no shortage is to be anticipated. In Scotland pastures showed signs of improvement in the last week of March ; fodder was becoming exhausted in most districts but ample supplies of concentrated foodstuffs were available.

Milk yields were well maintained throughout the area, though a few districts in Scotland showed a slight decrease due to cold weather.

In England and Wales in lowland flocks the fall of lambs has been about up to average but owing to the adverse weather prevailing during the early part of the month, mortality amongst ewes and lambs was rather higher than usual. Prospects for lambing amongst hill flocks appeared promising.

In Northern Ireland dairy stock are in good condition though reports of sterility have been received from some districts. The milk yield has been normal for the season.

United States ; The week ending April 2 was practically the worst of the winter in its effect on livestock. There were widespread reports of suffering and considerable losses were sustained in the Great Plains and Rocky Mountains. Early lambing was unfavourably affected and some pigs were lost in the northern Great Plains. In the northwestern part of the grazing area conditions of livestock and pasture were rather more favourable.

The following data of the average number of hens and pullets and layings per farm flock reflect the trend of total production of eggs :

	1931	1930	1929	Average 1925-29
Average number of hens and pullets of laying age in farm flocks of crop reporters on March 1, 1931	83.6	88.0	84.0	85.9
Aggregate of average layings per farm flock on Jan. 1, Feb. 1, March 1.	75.3	71.5	64.5	64.9

The mild winter is mainly responsible for the heavy layings so far which for the three reported average layings in January, February and March combined have amounted to 87.4 eggs per hundred birds compared with 80.3 eggs for the same dates last year and 74.2 for the 1925-29 average of these months. The reaction to be expected later to a seasonal lower rate of layings per hen, accentuated by the smaller number of layers, will tend to reduce layings per flock to below the level of recent years.

Algeria During March, livestock which survived the winter were favoured by improving feed conditions ; at the end of the month, although still thin, they had quite recovered ; losses by exhaustion were checked.

It is estimated that losses this winter are considerable, especially of sheep and goats ; according to estimates made, losses of the latter exceed 50 %, the value of the livestock having been considerably reduced. Losses of cattle are smaller, amounting to about 20-25 % according to various estimates.

French Morocco : Health is generally good. The fodder position, which in February was passable in the north and very bad in the south improved in March, and at the end of the month, though still thin, the herds were in good condition. Mortality from physiological starvation, very great in January and February, decreased, though the cold and the rain at the beginning of March led to the death of a certain number of animals.

The number of pigs in Germany on March 2, 1931.

The recent estimate indicates a decrease in the number of pigs compared with that given by the estimate of December 1, 1930 ; this reduction is due to the fact that at this period of the year pigs ready for slaughter are eliminated. Young pigs under 6 months of age have increased in number as have also sows for reproduction. From the quarterly estimate of numbers of pigs, it is for the first time possible to compare the figures for March of the current year with those of March of last year. The number of pigs on March 1, 1931 is considerably larger than on March 1, 1930. As the total number of sows in farrow is also considerably larger than in the spring of last year, a large increase in pig numbers may be anticipated parallel to that of 1930. It must, however, be borne in mind that the number of young sows for reproduction is smaller than in the spring of 1930.

Numbers of pigs in Germany (1).

CLASSIFICATION BY SEX AND AGE	2 March 1931	1 Dec. 1930	1 Sept. 1930	2 June 1930	1 March 1930	2 Dec. 1929	2 Sept. 1929	1 June 1929	1 Dec. 1928	1 June 1928	1 Dec. 1927	1 Dec. 1913 (1)
(1000 head).												
<i>Totals</i>	21,790	23,365	23,423	19,805	18,649	19,944	19,604	16,795	20,106	20,187	22,899	22,533
<i>Sucking pigs under 8 weeks of age</i>	5,750	5,440	6,522	5,091	5,012	4,417	5,373	4,160	4,003	4,936	4,379	13,350
<i>Young pigs from 8 weeks to 6 months of age</i>	10,231	10,003	9,809	9,178	8,555	8,693	8,290	8,099	8,487	9,557	9,910	
<i>Pigs from 6 months to 1 year of age</i>	3,939	5,470	5,125	3,842	3,487	4,599	4,238	3,060	5,129	4,149	5,751	6,677
Of which :												
Boars for service	58	67	57	57	54	56	50	48	53	52	62	—
Sows for breeding (total)	706	673	812	878	722	663	652	671	556	707	504	—
Number of sows served	(425)	(369)	(442)	(574)	(455)	(383)	(363)	(405)	(312)	(422)	—	—
Other swine	3,176	4,730	4,256	2,009	2,712	3,880	3,585	2,341	4,520	3,390	5,185	—
<i>Pigs, 1 year old and over</i>	1,870	2,451	1,967	1,694	1,595	2,235	1,658	1,475	2,487	1,645	2,858	2,508
Of which :												
Boars for service	62	62	61	57	51	50	58	55	52	60	55	—
Sows for breeding	1,517	1,496	1,467	1,856	1,229	1,179	1,208	1,145	1,063	1,150	1,218	—
Sows served	(927)	(939)	(861)	(915)	(792)	(775)	(737)	(787)	—	—	—	—
Other swine	291	893	440	280	315	1,006	387	275	1,372	835	1,584	—

(1) Present territory, excluding the Saar.

Livestock in Czechoslovakia.

The provisional data of the Census of May 27, 1930 of the numbers of livestock and poultry, compared with the final census figures of December 31, 1925, are as follows :

Classification	Census 27-V-1930	Census 31-XII-1925
Horses	749,635	740,202
Asses	1,380	1,730
Hinnies.	113	147
Mules	1,001	2,138
Cattle	4,546,640	4,691,320
Buffaloes	1,353	1,250
Sheep	831,451	861,128
Goats	1,080,204	1,244,701
Swine	3,087,618	2,539,201
of which		
sows for reproduction	445,852	304,559
Fowls	27,011,016	—
of which those born in 1930	11,247,278	—
fowls which have survived the winter	15,763,728	16,037,450
Geese	7,601,275	—
of which those born in 1930	6,327,169	—
geese which have survived the winter	1,274,106	1,540,947
Ducks	1,730,731	—
of which those born in 1930	1,535,996	—
ducks which have survived the winter	194,735	211,081

Due to the difference in the dates of these censuses, the data are not strictly comparable.

The New Zealand Dairying Industry in 1929-30.

Of the total of 288 million lb. butterfat sent to dairy factories in the year 1929-30. (ending in the majority of cases in July), 72 % was used for butter, 26 % was contained in milk used for cheese, and the remaining 2 % was chiefly used for the manufacture of condensed and dried milk. The actual quantities in these three categories were respectively 15 %, 2 % and 21 % above those in 1928-29. The production of butter was 16 % greater than in 1928-29, that of whey butter 8 % less, while that of cheese showed a very slight decline. The amount of butter forwarded for export in 1929-30 was 91,500 tons against 78,900 in the preceding year; the corresponding figures for cheese were 84,700 and 82,600 tons. Butter has thus regained the quantitative ascendancy over cheese in production and export, lost since 1907.

Expenditure and value of product per lb. of butterfat for factories engaged in the manufacture of butter and cheese were each 12 % less than in 1928-29. The number of factories was 491 an increase of one on the preceding year while the number of persons employed showed a decrease of 1 %.

TRADE

COUNTRIES	FEBRUARY				SEVEN MONTHS (August 1-February 28)				TWELVE MONTHS (August 1-July 31)	
	EXPORTS		IMPORTS		EXPORTS		IMPORTS		EXPORTS	IMPORTS
	1931	1930	1931	1930	1930-31	1929-30	1930-31	1929-30	1929-30	1929-30
Wheat. — Thousand centals (1 cental = 100 lbs).										
<i>Exporting Countries:</i>										
Bulgaria	9	0	0	33	836	31	0	908	66	930
Hungary	240	348	0	0	3,093	6,601	0	0	9,943	0
Lithuania	106	9	0	0	353	11	4	2	55	2
Rumania . . . . .	...	...	...	...	(1) 6,270 (1)	137 (1)	4 (1)	40	1,279	40
Yugoslavia	0	216	0	...	2,760	11,490	0	2	13,296	2
Canada	6,177	4,039	7	9	89,157	53,054	40	553	93,461	602
United States	82	3,111	604	1,005	27,049	38,733	7,394	3,353	57,974	7,885
Argentina	9,736	6,484	—	—	25,364	62,279	—	—	80,880	—
Chile	22	0	0	0	423	9	0	0	481	0
India	22	9	1,455	534	1,883	243	3,384	2,522	2,758	3,931
Algeria . . . . .	...	...	...	...	(1) 4,632 (1)	1,497 (1)	88 (1)	487	3,206	545
Tunis	33	86	97	13	1,283	2,467	273	79	3,562	90
Australia . . . . .	...	...	...	...	(2) 23,034 (2)	9,112 (2)	0 (2)	0	24,400	0
<i>Importing Countries:</i>										
Germany	11	97	974	3,651	249	2,216	10,587	23,574	2,293	31,725
Austria	0	15	397	376	84	26	2,580	3,373	68	6,455
Belgium . . . . .	...	...	...	...	(2) 384 (2)	628 (2)	13,545 (2)	13,186	865	25,779
Denmark	4	18	203	134	20	115	2,416	1,900	128	2,903
Spain	0	0	0	37	4	11	0	2,108	11	2,152
Estonia	0	0	2	51	0	0	260	346	0	540
Irish Free State . . . . .	...	...	...	...	(2) 18 (2)	0 (2)	3,649 (2)	2,983	0	5,547
France	0	1,171	2,950	1,579	946	1,651	20,521	14,465	8,880	19,954
Gr. Brit. and N. Ir.	42	139	5,690	6,250	452	1,135	73,538	70,228	1,482	114,048
Greece	0	0	1,008	935	0	0	7,513	7,090	0	12,339
Italy	0	0	3,276	1,638	22	4	27,518	8,142	4	27,150
Latvia	0	0	108	123	0	0	723	899	0	1,523
Norway	—	—	150	183	—	—	2,044	1,407	—	2,216
Netherlands	214	15	1,032	1,056	430	172	10,781	8,556	231	14,936
Poland	117	51	2	7	1,193	159	35	203	289	831
Portugal	—	—	20	108	—	—	150	714	—	3,732
Sweden	2	20	190	448	26	897	2,067	3,620	1,003	4,082
Switzerland	0	0	714	633	0	0	7,083	5,700	0	9,590
Czechoslovakia	0	4	35	273	—	08	4,506	2,158	108	3,602
Japan	—	—	1,250	750	—	—	6,724	5,796	—	10,922
Syria and Lebanon . . . . .	...	...	...	...	(2) 97 (2)	0 (2)	33 (2)	112	26	146
Egypt . . . . .	...	...	...	...	(2) 2 (2)	9 (2)	505 (2)	0	49	24
Union of South Africa . . . . .	...	...	...	...	(1) 0 (1)	0 (1)	611 (1)	1,144	0	1,680
New Zealand . . . . .	...	...	...	...	(2) 0 (2)	130 (2)	66 (2)	95	130	170
Totals	16,817	15,632	20,173	19,925	191,566	192,984	208,739	185,751	312,948	316,432
Rye. — Thousand centals (1 cental = 100 lbs).										
<i>Exporting Countries:</i>										
Germany	15	628	57	161	1,195	7,688	463	1,398	10,520	1,022
Bulgaria	62	0	0	0	699	9	0	0	0	0
Hungary	110	106	0	0	1,172	1,750	0	0	2,919	0
Poland	388	624	0	0	4,667	4,394	0	13	7,293	20
Rumania . . . . .	...	...	...	...	(1) 595 (1)	340 (1)	0 (1)	0	377	0
Czechoslovakia	37	95	4	26	437	906	115	137	1,325	254
Yugoslavia	0	0	0	0	0	29	4	0	33	0
Canada	29	13	0	15	650	110	0	110	194	150
United States	11	18	—	—	57	1,307	—	—	1,378	—
Argentina	73	4	—	—	300	714	—	—	767	—
Algeria . . . . .	...	...	...	...	(1) 24 (1)	28 (1)	0 (1)	4	35	4
<i>Importing Countries:</i>										
Austria	0	0	214	179	9	0	1,045	1,391	2	2,857
Belgium . . . . .	...	...	...	...	(2) 18 (2)	2 (2)	1,362 (2)	522	7	983
Denmark	0	0	214	328	0	2	4,759	3,651	2	6,151
Estonia	0	0	29	159	0	0	82	778	0	1,563
Finland	0	0	2	20	0	0	1,218	2,441	4	3,314
France	0	0	137	4	0	2	653	146	7	181
Italy	0	0	24	22	0	0	362	86	0	324
Latvia	0	0	40	245	0	2	192	1,477	7	2,191
Lithuania	35	2	0	0	93	7	0	24	86	24
Norway	0	0	335	503	0	0	1,978	2,187	0	3,905
Netherlands	55	4	567	163	198	64	3,937	1,071	90	2,906
Sweden	0	0	20	227	0	9	412	1,424	11	2,240
Switzerland	0	0	11	2	0	0	119	108	0	154
Totals	815	1,494	1,654	2,632	10,128	17,370	16,685	17,569	35,978	39,843

(1) (2) See notes page 237.

COUNTRIES	FEBRUARY				SEVEN MONTHS (August 1-February 28)				TWELVE MONTHS (August 1-July 31)	
	EXPORTS		IMPORTS		EXPORTS		IMPORTS		EXPORTS	IMPORTS
	1931	1930	1931	1930	1930-31	1929-30	1930-31	1929-30	1929-30	1929-30
Wheat flour. — Thousand cents (1 cental = 100 lbs).										
<i>Exporting Countries:</i>										
Germany	2	95	20	101	115	893	137	582	1,226	710
Belgium	...	...	...	...	(2) 95 (2)	174 (2)	184 (2)	531	251	564
Bulgaria	0	0	0	0	79	7	0	0	7	0
Spain	11	2	0	0	44	51	0	0	66	0
France	586	891	20	33	3,686	1,131	386	187	3,706	392
Hungary	152	196	0	0	2,980	3,898	0	0	5,664	0
Italy	121	172	13	7	783	1,135	101	33	1,400	93
Latvia	4	0	0	0	62	20	2	2	42	2
Poland	57	18	2	2	430	64	13	22	154	35
Rumania	...	...	...	...	(1) 251 (1)	104 (1)	0 (1)	0	317	0
Yugoslavia	4	11	0	0	75	240	2	0	320	2
Canada	814	941	4	18	8,556	7,480	31	90	13,285	148
United States	1,495	1,817	0	0	15,141	15,640	2	2	25,234	2
Argentina	130	229	—	—	1,142	1,623	—	—	2,604	—
Chile	4	9	0	0	90	115	0	11	203	18
India	62	126	0	0	606	602	2	2	1,113	2
Japan	154	112	7	46	1,839	1,356	161	181	2,304	379
Algeria	...	...	...	...	(1) 185 (1)	46 (1)	18 (1)	31	134	57
Tunis	24	7	2	0	154	82	9	2	159	4
Australia	...	...	...	...	(2) 4,850 (2)	4,332 (2)	0 (2)	0	9,165	0
<i>Importing Countries:</i>										
Austria	0	0	216	231	2	2	1,433	1,896	4	3,772
Denmark	2	2	112	97	15	20	1,012	836	31	1,440
Estonia	0	0	7	9	0	0	73	0	0	123
Irish Free State	...	...	...	...	(2) 24 (2)	31 (2)	1,856 (2)	1,819	64	3,622
Finland	...	...	77	77	1,444	1,444	1,579	—	—	2,437
Gr. Britain and N. Ir.	328	298	825	970	2,723	2,771	7,690	7,196	4,727	12,487
Greece	—	—	4	31	—	—	104	346	—	494
Norway	0	0	73	108	2	2	772	758	2	1,376
Netherlands	7	15	251	152	73	141	2,335	1,318	203	2,780
Portugal	—	—	33	2	—	—	108	82	—	152
Sweden	0	7	4	33	2	66	53	229	90	379
Czechoslovakia	2	0	11	280	0	7	2,383	2,070	13	3,833
Ceylon	...	...	20	37	—	—	282	273	—	430
Java and Madura	—	—	...	...	—	—	(2) 459 (2)	487	—	1,142
Indo-China	—	—	...	...	—	—	(2) 245 (2)	256	—	549
Syria and Lebanon	...	...	...	...	(2) 2 (2)	0 (2)	93 (2)	214	0	425
Egypt	...	...	...	...	(2) 0 (2)	2 (2)	2,056 (2)	2,474	4	4,729
Union of South Africa	...	...	...	...	(1) 7 (1)	11 (1)	181 (1)	265	31	493
New Zealand	...	...	...	...	(2) 0 (2)	2 (2)	101 (2)	93	4	181
Totals	3,959	4,949	1,719	2,334	44,974	42,138	23,676	23,946	72,617	42,767
Barley. — Thousand cents (1 cental = 100 lbs).										
<i>Exporting Countries:</i>										
Bulgaria	34	13	0	0	1,109	243	0	0	309	9
Spain	15	18	0	0	128	93	0	7	163	0
Hungary	57	66	0	0	525	2,035	0	0	2,363	0
Lithuania	2	44	0	0	11	64	0	0	143	0
Poland	214	575	0	0	2,352	4,116	0	2	5,794	2
Rumania	...	...	...	...	(1) 23,680 (1)	23,235 (1)	0 (1)	0	31,365	0
Czechoslovakia	101	95	0	2	2,862	2,321	2	9	2,518	15
Yugoslavia	0	2	9	13	11	220	128	150	282	159
Canada	57	13	0	0	1,393	1,140	0	4	1,250	9
United States	412	395	—	—	3,274	7,251	—	—	8,774	—
Argentina	595	183	—	—	2,705	1,323	—	—	2,575	—
Chile	49	112	0	0	317	269	0	0	897	0
India	0	0	0	0	2	4	0	7	26	11
Syria and Lebanon	...	...	...	...	(2) 355 (2)	267 (2)	4 (2)	20	503	20
Algeria	...	...	...	...	(1) 1,041 (1)	1,735 (1)	4 (1)	123	2,202	130
Egypt	...	...	...	...	(2) 2 (2)	62 (2)	46 (2)	18	128	40
Tunis	4	66	35	2	161	2,330	248	22	2,652	58
Australia	...	...	...	...	(2) 681 (2)	208 (2)	0 (2)	0	324	0
<i>Importing Countries:</i>										
Germany	0	86	851	1,759	62	115	10,340	40,248	1,089	49,735
Austria	0	2	201	82	0	9	1,281	1,023	9	1,658
Belgium	...	...	...	...	(2) 205 (2)	68 (2)	5,701 (2)	4,381	176	7,857
Denmark	258	31	880	196	1,012	1,153	10,016	919	1,232	4,456
Estonia	...	...	0	11	—	—	13	46	—	66
Irish Free State	...	...	...	...	(2) 20 (2)	24 (2)	20 (2)	7	20	388
France	2	71	602	137	15	170	4,273	1,186	348	1,437
Gr. Britain and N. Ir.	2	0	794	571	20	22	13,444	9,716	33	14,454
Greece	—	—	7	26	—	—	68	324	—	401
Italy	0	0	75	33	0	9	505	150	9	368
Latvia	0	0	28	13	0	0	163	86	0	123
Norway	0	0	62	7	0	0	712	357	0	752
Netherlands	108	37	915	655	309	366	9,544	4,508	487	7,984
Switzerland	0	0	291	128	0	0	1,332	1,290	0	1,918
Totals	1,940	1,811	4,137	3,939	42,338	49,838	58,339	64,612	65,677	91,391

(1) (2) See notes page 237.

COUNTRIES	FEBRUARY				SEVEN MONTHS (August 1-February 28)				TWELVE MONTHS (August 1-July 31)	
	EXPORTS		IMPORTS		EXPORTS		IMPORTS		EXPORTS	IMPORTS
	1931	1930	1931	1930	1930-31	1929-30	1930-31	1929-30	1929-30	1929-30
Oats. — Thousand centals (1 cental = 100 lbs).										
<i>Exporting Countries:</i>										
Germany	2	1,221	115	88	206	8,949	300	538	15,245	620
Irish Free State	...	...	...	...	(2) 181	(2) 452	(2) 128	(2) 15	661	121
Hungary	0	37	4	0	11	569	33	0	728	0
Lithuania	11	40	0	0	71	71	0	0	179	0
Poland	7	108	0	4	95	847	0	51	1,803	66
Rumania	...	...	...	...	(1) 1,155	(1) 019	(1) 0	(1) 0	1,834	0
Czechoslovakia	18	90	2	22	694	893	7	53	1,345	128
Yugoslavia	0	0	2	15	0	0	75	18	9	51
Canada	44	18	0	18	734	375	229	728	679	1,182
United States	4	71	4	0	86	1,285	116	22	1,576	49
Argentina	1,739	683	—	—	7,434	2,850	—	—	6,508	—
Chile	67	11	0	0	1,001	214	0	0	622	—
Algeria	...	...	...	...	(1) 642	(1) 212	(1) 86	(1) 108	503	128
Tunis	26	26	0	0	386	602	9	0	800	0
<i>Importing Countries:</i>										
Austria	0	0	203	207	2	0	1,109	1,534	2	2,707
Belgium	...	...	...	...	(2) 2	(2) 0	(2) 1,911	(2) 1,285	4	2,773
Denmark	11	2	101	247	18	15	534	1,188	20	2,800
Estonia	0	0	13	18	0	0	42	37	0	106
Finland	2	0	0	33	4	0	60	240	0	476
France	0	9	128	106	11	22	1,149	1,296	77	1,671
Gr. Brit. and N. Irel.	35	46	492	573	73	84	5,933	4,702	306	9,658
Greece	—	—	0	13	—	—	0	185	—	207
Italy	0	0	267	121	0	0	2,549	776	0	1,700
Latvia	0	0	4	0	4	0	18	82	163	99
Norway	0	0	0	13	0	0	0	71	2	170
Netherlands	99	29	174	260	132	110	1,920	2,330	185	3,728
Sweden	9	9	44	40	24	44	545	882	60	1,290
Switzerland	0	0	386	359	0	0	2,802	2,549	0	4,398
Australia	...	...	...	...	(2) 42	(1) 11	(2) 0	(2) 2	49	4
Totals	2,064	2,406	1,939	2,146	13,011	18,641	19,354	18,671	33,620	34,133
Maize. — Thousand centals (1 cental = 100 lbs).										
FOUR MONTHS (November 1-February 28)										
<i>Exporting Countries:</i>										
Bulgaria	95	130	0	0	1,135	1,076	0	0	4,017	0
Hungary	15	443	88	2	176	2,388	243	4	3,351	132
Rumania	...	...	...	...	(1) 4,050	(1) 6,451	(1) 0	(1) 0	28,424	2
Yugoslavia	692	789	0	0	3,130	4,442	7	0	12,013	83
United States	218	478	37	22	375	1,738	342	106	4,303	706
Argentina	9,304	6,486	—	—	44,889	30,329	—	—	96,331	—
Brazil	...	...	...	...	(1) 11	(1) 236	—	—	323	—
Java and Madura	375	49	—	—	465	51	—	—	1,759	—
Indo-China	...	...	...	...	(2) 1,498	(2) 1,188	—	—	2,339	—
Syria and Lebanon	...	...	...	...	(2) 51	(2) 146	(2) 4	(2) 4	434	35
Egypt	...	...	...	...	(2) 9	(2) 9	(2) 18	(2) 4	97	33
Union of South Africa	...	...	...	...	(1) 972	(1) 807	(1) 0	(1) 0	12,267	0
<i>Importing Countries:</i>										
Germany	0	0	617	1,202	0	0	2,403	6,907	0	18,506
Austria	0	0	412	483	0	4	1,614	1,805	18	4,812
Belgium	...	...	...	...	(2) 106	(2) 75	(2) 3,657	(2) 3,415	220	12,906
Denmark	0	0	644	509	0	0	2,793	2,092	0	6,350
Spain	0	0	527	445	0	0	1,285	2,366	0	3,840
Irish Free State	...	...	...	...	(2) 0	(2) 0	(2) 2,094	(2) 1,745	29	8,047
Finland	...	...	...	...	...	...	...	...	...	...
France	4	4	1,475	1,343	22	0	7,359	6,408	46	17,857
Gr. Brit. and N. Ir.	212	134	3,148	2,185	789	478	17,465	12,156	2,150	36,906
Greece	—	—	4	95	—	—	80	112	—	185
Italy	—	—	862	1,334	—	2	4,727	5,249	7	15,253
Norway	—	—	200	194	—	—	1,014	966	—	2,676
Netherlands	28	57	1,709	2,002	141	183	10,578	8,599	626	23,177
Poland	0	0	—	9	0	0	82	90	4	892
Portugal	—	—	143	57	—	—	873	387	—	1,443
Sweden	—	—	208	237	—	—	1,870	988	—	2,232
Switzerland	0	0	238	234	0	0	1,184	1,003	0	2,342
Czechoslovakia	0	0	653	414	0	0	2,908	1,739	2	5,443
Canada	—	—	192	445	4	0	1,711	3,292	4	7,573
Japan	—	—	86	82	—	—	386	450	—	1,466
Tunis	0	0	37	0	0	0	143	0	2	9
Totals	10,941	8,570	11,019	11,356	57,811	49,690	64,853	59,093	168,771	166,694

(1) (2) See notes page 237.

COUNTRIES	FEBRUARY				TWO MONTHS (January 1-February 28)				TWELVE MONTHS (January 1-Dec. 31)	
	EXPORTS		IMPORTS		EXPORTS		IMPORTS		EXPORTS	IMPORTS
	1931	1930	1931	1930	1931	1930	1931	1930	1930	1930
Rice. — Thousand cents (1 cental = 100 lbs).										
<i>Exporting Countries:</i>										
Spain	55	194	0	0	88	227	0	0	1,252	0
Italy	373	531	0	2	785	723	2	7	4,716	134
United States	280	223	40	33	642	549	84	86	2,621	298
India	3,278	5,761	2	0	6,557	8,803	11	9	57,318	139
Indo-China	—	—	—	—	(a) 1,109 (2)	2,721	—	—	24,727	—
Siam	2,044	2,341	—	—	4,184	4,910	—	—	20,598	—
Egypt	—	—	—	—	(2) 119 (2)	176 (2)	4 (2)	42	1,206	251
<i>Importing Countries:</i>										
Germany	53	79	220	256	112	203	454	509	1,594	5,503
Austria	0	0	46	53	0	0	101	97	0	606
Belgium	—	—	—	—	(2) 13 (2)	0 (2)	37 (2)	77	9	1,047
Denmark	0	0	13	13	0	0	26	31	0	139
Estonia	—	—	2	2	—	—	4	4	—	35
Irish Free State	—	—	—	—	(2) 0 (2)	0 (2)	4 (2)	2	—	46
France	62	212	317	620	134	357	698	805	1,903	5,659
Gr. Brit. and N. Ir.	18	22	132	104	31	37	282	280	218	2,564
Greece	—	—	35	35	—	—	84	82	—	536
Hungary	0	0	22	18	0	2	53	51	9	388
Latvia	0	0	9	0	0	2	24	4	7	62
Lithuania	0	0	4	2	0	0	4	2	0	31
Norway	—	—	4	4	—	—	15	13	—	101
Netherlands	146	126	60	84	278	254	306	154	2,035	3,563
Poland	9	2	2	2	18	9	2	165	126	1,177
Portugal	—	—	35	42	—	—	57	119	—	941
Sweden	—	—	0	0	—	—	0	0	—	161
Switzerland	0	0	26	29	0	0	71	55	0	408
Czechoslovakia	0	0	40	51	0	0	84	108	0	979
Yugoslavia	0	0	37	26	2	0	77	53	2	516
Canada	0	0	66	49	0	0	137	86	0	584
Chile	—	—	33	42	—	—	84	97	—	518
Ceylon	0	0	913	902	—	2	1,865	2,064	9	10,809
Java and Madura	—	—	—	—	(2) 13 (2)	2 (2)	617 (2)	485	117	5,487
Japan	273	7	152	408	503	13	256	809	1,252	3,973
Syria and Lebanon	—	—	—	—	(2) 0 (2)	0 (2)	22 (2)	20	2	320
Algeria	—	—	—	—	—	—	—	—	0	104
Tunis	—	—	—	—	—	—	—	—	0	24
Union of S. Africa	0	0	2	2	—	—	4	—	0	930
Australia	—	—	—	—	(2) 11 (2)	7 (2)	4 (2)	9	71	75
New Zealand	—	—	—	—	(2) 0 (2)	0 (2)	4 (2)	9	0	66
Totals	6,571	9,498	2,212	2,785	14,691	19,006	5,427	6,342	119,991	48,160
Linseed. — Thousand cents (1 cental = 100 lbs).										
<i>Exporting Countries:</i>										
Estonia	0	2	0	0	2	2	0	0	55	2
Lithuania	20	0	0	0	79	46	0	0	443	—
Argentina	5,840	3,234	—	—	10,670	8,146	—	—	25,496	—
India	51	73	0	0	159	190	0	0	5,763	0
Tunis	0	0	0	0	0	0	0	0	9	0
<i>Importing Countries:</i>										
Germany	0	2	578	538	2	4	1,078	802	28	5,194
Belgium	—	—	—	—	(2) 7 (2)	2 (2)	280 (2)	176	68	1,676
Denmark	—	—	40	42	—	—	68	42	—	359
Spain	—	—	31	22	—	—	62	46	—	419
Finland	0	0	0	0	0	0	11	0	0	79
France	0	2	320	104	2	4	534	357	15	4,288
Gr. Brit. and N. Irel.	0	2	642	377	0	2	1,093	525	9	5,031
Greece	0	0	11	2	0	0	15	9	2	64
Hungary	0	2	0	15	0	2	2	15	143	106
Italy	0	0	84	64	0	0	161	90	0	1,175
Latvia	7	13	9	13	33	24	13	22	236	168
Norway	—	—	39	15	—	—	66	33	—	367
Netherlands	4	31	573	185	9	42	1,043	373	146	5,617
Poland	0	4	7	18	2	13	11	20	31	150
Sweden	—	—	104	67	—	—	115	60	—	798
Czechoslovakia	0	0	0	0	2	2	24	9	18	445
Yugoslavia	0	2	7	4	0	2	11	4	2	121
Canada	2	0	0	33	2	0	0	32	783	454
United States	—	—	534	1,276	—	—	730	1,878	—	7,090
Japan	—	—	15	0	—	—	24	0	—	126
Australia	—	—	—	—	(2) 0 (2)	0 (2)	13 (2)	42	0	340
Totals	5,933	3,376	2,997	2,765	10,969	8,481	5,334	4,536	33,215	24,939

(2) See notes page 237.

COUNTRIES	FEBRUARY				TWO MONTHS (January 1-February 28)				TWELVE MONTHS (January 1-Dec. 31)	
	EXPORTS		IMPORTS		EXPORTS		IMPORTS		EXPORTS	IMPORTS
	1931	1930	1931	1930	1931	1930	1931	1930	1930	1930
Butter. — (Thousand lbs.)										
<i>Exporting Countries:</i>										
Austria	401	556	2	4	851	1,041	4	18	4,112	545
Denmark	26,888	26,198	55	106	57,955	57,267	64	137	372,558	1,389
Estonia	1,052	1,025	0	0	2,500	2,509	0	0	31,010	0
Irish Free State	...	...	...	...	(2) 384	(2) 631	(2) 439	(2) 829	58,815	3,391
Finland	3,084	3,327	0	0	6,352	6,676	0	0	37,726	7
France	985	730	7,315	1,479	1,665	1,274	10,285	3,702	12,095	12,924
Hungary	121	373	0	0	406	906	0	0	3,430	40
Latvia	1,711	2,037	2	4	4,090	4,963	4	7	40,630	49
Lithuania	586	437	0	0	1,206	955	0	0	16,219	0
Netherlands	4,010	5,333	573	284	9,030	12,249	1,506	701	92,394	4,396
Poland	1,717	1,664	0	0	3,393	3,384	2	0	26,714	29
Sweden	4,405	5,529	0	0	8,946	11,173	2	2	58,857	18
U. S. S. R.	...	...	...	...	...	...	...	...	(3) 17,229	...
Argentina	8,065	4,694	—	—	14,564	11,235	—	—	51,756	—
India	35	88	18	15	93	148	46	37	551	282
Syria and Lebanon	...	...	...	...	(2) 280	(2) 220	(2) 7	(2) 13	2,161	172
Australia	...	...	...	...	(2) 19,313	(2) 13,616	(2) 0	(2) 0	126,411	2
New Zealand	20,915	25,338	—	—	46,837	58,368	—	—	208,170	—
<i>Importing Countries:</i>										
Germany	26	66	17,101	17,635	49	97	34,214	42,430	578	293,560
Belgium	...	...	...	...	(2) 168	(2) 168	(2) 3,865	(2) 1,640	2,648	22,412
Spain	9	13	4	29	18	24	7	55	161	328
Gr. Brit. and N. Ire.	7,143	1,563	66,880	58,654	11,319	4,068	142,523	180,673	21,028	764,782
Greece	...	...	104	121	...	...	214	225	1,420	...
Italy	84	66	721	229	132	97	1,480	487	1,843	3,115
Norway	198	77	18	18	287	163	44	51	236	1,530
Switzerland	2	4	1,881	1,076	2	9	3,408	2,405	42	18,786
Czechoslovakia	160	176	2	7	280	284	18	7	694	714
Canada	42	57	470	8,638	108	119	917	16,173	1,179	38,605
United States	141	390	97	165	366	710	207	298	2,967	2,471
Ceylon	—	—	46	57	—	—	106	104	—	723
Java and Madura	—	—	...	...	—	—	(2) 787	(2) 743	—	7,657
Japan	—	—	13	106	—	—	53	192	—	611
Algeria	...	...	...	...	...	...	...	...	82	3,232
Egypt	...	...	...	...	0	0	287	291	42	2,417
Tunis	0	2	66	71	0	2	148	150	13	829
Totals	81,885	86,232	95,386	88,636	190,604	192,446	260,543	291,370	1,191,751	1,186,336
Cheese. — (Thousand lbs.)										
<i>Exporting Countries:</i>										
Denmark	655	862	53	51	1,440	2,050	117	112	12,626	809
Finland	465	344	4	4	1,087	705	9	7	4,683	35
Italy	6,576	5,595	717	919	11,383	10,362	1,241	1,605	80,855	12,562
Lithuania	143	97	0	0	333	212	0	0	1,960	11
Norway	187	117	44	46	304	218	86	104	1,390	760
Netherlands	12,866	13,466	90	97	27,747	29,934	201	254	206,739	1,510
Poland	298	176	53	55	514	833	112	148	3,267	1,074
Switzerland	4,557	4,923	483	366	9,015	10,185	985	754	66,146	4,251
Czechoslovakia	752	441	218	179	1,696	783	381	366	8,274	2,968
Yugoslavia	201	24	22	24	229	328	37	49	4,538	300
Canada	306	280	93	93	1,224	1,832	174	260	66,955	1,779
Australia	...	...	...	...	(2) 527	(2) 29	(2) 2	(2) 24	7,273	150
New Zealand	24,061	17,875	0	0	44,556	43,968	0	0	201,250	7
<i>Importing Countries:</i>										
Germany	578	434	8,611	8,977	1,087	996	18,085	20,521	5,410	137,459
Austria	353	333	392	334	778	421	705	692	4,482	5,687
Belgium	...	...	...	...	(2) 60	(2) 66	(2) 4,317	(2) 4,244	875	51,106
Spain	15	7	401	408	29	11	569	816	190	5,137
Irish Free State	...	...	...	...	(2) 13	(2) 13	(2) 262	(2) 205	194	2,350
France	3,772	3,629	5,935	4,517	6,396	6,482	11,427	8,847	38,921	65,524
Gr. Brit. and N. Ire.	611	650	31,431	22,478	1,288	1,433	57,567	60,314	8,927	348,592
Greece	15	31	231	302	20	33	428	814	262	2,302
Hungary	7	4	20	26	20	9	57	71	93	386
Portugal	—	—	22	33	—	—	49	86	—	1,010
Sweden	—	—	141	68	—	—	218	201	—	1,470
United States	123	216	4,061	4,396	320	412	8,184	9,755	2,130	66,318
India	0	0	79	60	0	2	212	183	7	1,128
Java and Madura	—	—	...	...	—	—	(2) 106	(2) 108	—	1,871
Syria and Lebanon	...	...	...	...	(2) 0	(2) 2	(2) 60	(2) 66	132	730
Algeria	...	...	...	...	...	...	...	...	212	10,327
Egypt	...	...	...	...	(2) 11	(2) 11	(2) 686	(2) 780	60	7,550
Tunis	2	2	130	123	2	2	326	258	29	1,746
Totals	56,563	49,596	53,531	45,998	110,965	110,857	166,553	111,639	737,955	730,737

(2) (3) See notes page 237.

COUNTRIES	FEBRUARY				SEVEN MONTHS (August 1-February 28)				TWELVE MONTHS (August 1-July 31)	
	EXPORTS		IMPORTS		EXPORTS		IMPORTS		EXPORTS	IMPORTS
	1931	1930	1931	1930	1930-31	1929-30	1930-31	1929-30	1929-30	1929-30
Cotton. — Thousand centals (1 cental = 100 lbs).										
<i>Exporting Countries:</i>										
United States	2,317	2,185	55	119	20,431	28,323	207	1,078	5,027	1,889
Argentina	4	2	—	—	225	209	—	—	507	—
Brazil	—	—	—	—	(1) 231	(1) 911	—	—	1,351	—
India	1,706	1,044	148	15	8,730	8,168	754	194	15,172	600
Egypt	—	—	—	—	(2) 3,408	(2) 3,060	(2) 0	(2) 0	1,367	0
<i>Importing Countries:</i>										
Germany	110	103	562	774	1,025	1,105	5,470	6,061	1,885	5,944
Austria	0	0	42	40	0	2	289	344	2	562
Belgium	—	—	—	—	(2) 71	(2) 64	(2) 785	(2) 1,027	106	2,087
Denmark	—	—	11	11	—	—	86	88	—	146
Spain	4	2	317	251	15	35	1,288	1,276	44	2,207
Estonia	0	0	11	15	0	0	55	90	0	130
Finland	0	0	15	9	0	0	112	95	2	143
France	40	64	838	752	328	366	5,624	5,388	668	8,272
Gr. Brit. and N. Irel.	22	29	734	1,248	282	340	7,255	9,453	709	13,181
Greece	0	0	15	11	—	2	119	42	2	68
Hungary	—	—	22	18	—	—	170	174	—	291
Italy	0	2	384	489	2	7	2,242	3,142	9	5,148
Latvia	0	0	2	11	—	0	44	53	0	77
Norway	—	—	4	4	—	—	35	31	—	48
Netherlands	0	0	92	71	—	—	608	617	7	1,027
Poland	2	2	84	75	13	4	873	767	26	1,215
Portugal	—	—	35	42	—	—	209	256	—	401
Sweden	—	—	35	64	—	—	284	324	—	518
Switzerland	0	0	46	55	0	0	410	434	0	639
Czechoslovakia	9	13	184	254	95	110	1,459	1,600	170	2,701
Yugoslavia	0	0	11	20	0	0	108	108	0	198
Canada	—	—	55	79	—	—	698	714	—	1,043
Japan	24	0	1,393	1,488	300	108	6,797	7,796	417	13,082
Algeria	—	—	—	—	(1) 2	(1) 4	(1) 0	(1) 2	33	4
Totals	4,238	4,406	5,082	5,924	41,167	43,136	35,957	41,137	63,554	64,567

Wool. — (Thousand lbs).

COUNTRIES	FEBRUARY				SEVEN MONTHS (August 1-February 28)				TWELVE MONTHS (August 1-July 31)	
	EXPORTS		IMPORTS		EXPORTS		IMPORTS		EXPORTS	IMPORTS
	1931	1930	1931	1930	1930-31	1929-30	1930-31	1929-30	1929-30	1929-30
Wool. — (Thousand lbs).										
<i>Exporting Countries:</i>										
Spain	86	198	1,098	295	2,586	4,921	3,067	1,290	8,062	5,781
Irish Free State	—	—	—	—	(2) 2,566	(2) 5,595	(2) 271	(2) 507	10,249	994
Hungary	82	97	196	168	1,334	2,716	1,032	791	10,013	1,561
Argentina	(a) 43,023	(b) 30,627	—	—	(141,149)	(121,528)	—	—	277,301	—
Chile	3,479	5,271	—	—	30,560	7,829	—	—	6,206	—
India	2,271	2,119	146	490	15,684	20,398	719	1,634	20,318	—
Syria and Lebanon	—	—	—	—	(2) 4,198	(2) 5,732	(2) 1,640	(2) 472	47,825	4,189
Algeria	—	—	—	—	(1) 8,640	(1) 4,945	(1) 304	(1) 364	7,485	1,810
Egypt	—	—	—	—	(a) 936	(2) 1,224	(2) 2	(2) 0	14,997	1,995
Tunis	29	31	20	57	(a) 93	(2) 273	(2) 428	(2) 423	2,533	2
Un. of S. Africa	(a) —	(b) —	—	—	(1) 120,192	(1) 139,846	(1) 33	(1) 0	651	1,113
Australia	(a) —	(b) —	—	—	(1) 1,204	(1) 2,224	(1) 430	(1) 185	288,877	0
New Zealand	(a) —	(b) —	—	—	(2) 412,347	(2) 332,255	(2) 467	(2) 1,523	7,401	298
19,119	32,845	0	0	0	(2) 16,910	(2) 18,343	(2) 37	(2) 201	736,152	2,837
1,854	2,101	0	0	0	—	—	—	—	47,375	664
18,043	13,093	0	0	0	—	—	—	—	2	156,771
13,093	13,093	0	0	0	—	—	—	—	7	43,473
<i>Importing Countries:</i>										
Germany	977	536	49,765	26,762	4,215	7,602	150,032	118,320	11,188	294,117
Austria	(a) 1,243	(b) 1,334	2,856	1,892	5,913	8,561	13,984	14,290	14,996	28,609
Belgium	(a) 7	(b) 57	811	1,975	176	220	6,424	7,167	366	16,665
Denmark	—	—	—	—	(2) 5,670	(2) 4,507	(2) 44,966	(2) 90,440	9,006	106,968
Finland	13	13	320	220	(2) 8,625	(2) 11,160	(2) 1,671	(2) 1,620	25,946	4,945
France	0	29	196	132	29	90	1,650	1,814	180	3,412
Gr. Britain and N. Ir.	3,788	4,378	78,948	64,461	25,270	30,712	232,996	227,513	86	1,322
Greece	28,072	34,489	82,244	81,924	134,172	101,410	355,699	344,048	55,920	548,920
Italy	0	9	162	101	157	84	1,316	1,224	333,774	779,672
Netherlands	(a) 130	(b) 121	14,273	14,504	911	919	51,174	38,153	650	2,714
Norway	157	35	476	1,010	1,032	1,807	4,859	6,762	2,024	95,006
Poland	13	73	112	152	317	595	858	966	2,785	13,109
Sweden	148	139	1,118	1,587	952	1,138	4,960	4,387	968	1,885
Switzerland	(a) 13	(b) 77	791	858	150	324	3,327	2,800	2,112	10,532
Czechoslovakia	225	249	3,512	2,859	1,210	1,062	15,637	17,758	527	6,257
Yugoslavia	—	—	862	1,347	—	—	6,539	7,064	3,838	34,743
Canada	84	2	1,470	2,610	110	18	9,727	9,396	—	15,741
United States	99	90	3,098	3,241	670	1,210	15,036	14,480	55	19,178
Japan	0	0	1,025	377	22	40	4,323	2,130	2,273	36,140
100,653	116,967	308,493	325,308	1,006,906	1,012,959	1,002,832	1,004,735	2,162,965	2,621,479	6,676
68	267	11,687	18,490	670	2	24	60,312	34,974	84	9,778
0	0	13,808	6,671	2	—	—	—	—	2,184	208,681
100,653	116,967	308,493	325,308	1,006,906	1,012,959	1,002,832	1,004,735	2,162,965	2,621,479	100,990

(a) = Wool, greasy; (b) = Wool, scoured.

(1) (2) See notes page 237.

COUNTRIES	FEBRUARY		EIGHT MONTHS (July 1-Feb. 28)		TWELVE MONTHS (July 1- June 30)	COUNTRIES	FEBRUARY		EIGHT MONTHS (July 1-Feb. 28)		TWELVE MONTHS (July 1- June 30)
	1931	1930	1930-31	1929-30	1929-30		1931	1930	1930-31	1929-30	1929-30
Coffee. (Thousand lbs.)						Tea. (Thousand lbs.)					
EXPORTS.						EXPORTS.					
<i>Exporting Countries:</i>						<i>Exporting Countries</i>					
Brazil . . . . .	...	...	1,040,245	1,022,190	1,965,031	Ceylon	18,001	17,677	156,076	157,020	251,286
India	3,261	4,788	10,064	8,450	31,698	India	16,023	13,856	310,057	330,604	360,752
Java and Madura .	2,463	2,765	29,198	45,014	55,696	Java and Madura .	12,628	13,872	101,129	101,702	154,682
						Japan	1,922	408	17,820	20,646	24,835
<i>Importing Countries:</i>						<i>Importing Countries:</i>					
Germany	117	75	893	806	470	Belgium . . . . .	...	...	(2)	20 (2)	18
Belgium . . . . .	...	...	(2)	1,660 (2)	655	Irish Free State .	...	...	(2)	95 (2)	112
France	0	4	57	18	22	France	4	2	26	44	57
Netherlands . . .	1,501	2,476	12,311	14,328	21,268	Gr. Brit. and N. Ir.	6,034	7,732	57,446	65,943	96,771
Portugal	46	53	386	351	571	Netherlands . . .	7	7	71	26	53
Switzerland . . .	31	18	218	121	227	United States . .	26	20	340	364	542
Canada	2	4	40	55	70	Syria and Lebanon .	...	...	(2)	11 (2)	24
United States . .	1,775	1,942	15,737	10,644	16,149	Algeria . . . . .	...	...	(7)	11 (7)	18
Ceylon	0	18	223	489	719	Union of S. Africa .	...	...	(1)	35 (1)	46
Syria and Lebanon .	...	...	(2)	42 (2)	71	Australia . . . . .	...	...	(2)	582 (2)	946
Australia . . . . .	...	...	(2)	31 (2)	42	New Zealand . . . .	...	...	(2)	71 (2)	40
Totals	—	—	—	—	2,123,715	Totals	56,335	53,376	637,790	677,543	899,901
IMPORTS.						IMPORTS.					
<i>Importing Countries:</i>						<i>Importing Countries</i>					
Germany	31,143	40,803	233,140	236,440	313,807	Germany	849	1,561	0,050	10,435	12,807
Austria	1,773	1,616	13,911	13,232	20,064	Austria	115	106	924	946	1,228
Belgium . . . . .	...	...	(2)	64,588 (2)	52,666	Belgium . . . . .	...	...	(2)	355 (2)	328
Bulgaria	174	126	1,071	1,279	1,735	Denmark	143	97	847	791	1,195
Denmark	4,758	4,938	39,377	36,650	58,518	Spain	11	26	194	198	317
Spain	4,160	2,877	35,036	31,511	54,768	Estonia	9	13	90	101	148
Estonia	24	11	210	216	298	Irish Free State .	...	...	(2)	14,950 (2)	14,085
Irish Free State .	...	...	(2)	231 (2)	216	Finland	24	33	172	194	278
Finland	937	3,080	20,894	24,897	38,614	France	357	348	2,297	2,260	3,305
France	36,734	30,001	263,098	252,893	385,618	Gr. Britain and N.					
Gr. Britain and N.						Ireland	38,570	42,086	425,030	441,111	553,356
Ireland	2,968	2,438	24,392	23,493	36,099	Greece	46	42	503	470	584
Greece	1,093	1,021	8,508	7,981	12,452	Hungary	42	33	505	626	714
Hungary	511	551	4,650	5,306	8,128	Italy	20	20	212	227	337
Italy	7,467	8,135	64,651	68,555	102,637	Latvia	11	18	117	154	203
Latvia	24	26	249	234	335	Lithuania	26	11	126	115	174
Lithuania	37	40	337	304	428	Norway	33	29	254	254	375
Norway	2,912	2,672	23,640	19,339	34,335	Netherlands . . .	3,732	2,452	21,378	19,502	29,366
Netherlands . . .	7,531	7,101	68,563	66,132	98,986	Poland	375	375	3,065	2,981	4,434
Poland	1,219	1,259	11,424	11,746	17,608	Portugal	42	33	392	481	666
Portugal	1,305	871	7,498	6,475	9,978	Rumania . . . . .	...	...	(7)	578 (7)	604
Rumania . . . . .	...	...	(1)	5,401 (1)	5,093	Sweden	88	68	604	564	877
Sweden	7,690	7,943	65,112	64,285	99,162	Switzerland . . .	168	130	1,118	1,034	1,567
Switzerland . . .	2,714	2,366	18,298	18,878	31,017	Czechoslovakia .	110	97	1,124	1,107	1,396
Czechoslovakia .	2,736	2,650	18,411	19,564	31,458	Yugoslavia	31	49	509	507	776
Yugoslavia	1,812	1,598	13,863	15,344	21,713	United States . .	2,385	2,084	29,449	28,435	46,767
Canada	2,315	2,235	19,698	18,065	20,018	Canada	5,223	5,802	61,864	62,949	86,899
United States . .	170,156	162,287	1,070,511	1,017,704	1,562,080	Chile	419	526	3,530	3,536	5,121
Chile	747	893	6,191	8,117	12,597	Syria and Lebanon .	...	...	(2)	247 (2)	278
Ceylon	256	295	2,540	2,390	3,150	Algeria . . . . .	...	...	(1)	1,545 (1)	5,322
Japan	317	315	2,828	2,507	4,004	Egypt . . . . .	...	...	(2)	6,773 (2)	10,600
Syria and Lebanon .	...	...	(2)	1,664 (2)	1,519	Tunis	73	205	2,041	2,136	3,144
Algeria . . . . .	...	...	(1)	14,800 (1)	13,869	Union of S. Africa .	...	...	(1)	6,557 (1)	5,832
Egypt . . . . .	...	...	(2)	7,002 (2)	16,779	Australia . . . . .	...	...	(2)	30,542 (2)	31,599
Tunis	258	421	2,224	2,736	3,470	New Zealand . . .	...	...	(2)	8,444 (2)	8,270
Un. of S. Africa .	...	...	(1)	15,840 (1)	17,201						
Australia . . . . .	...	...	(2)	1,493 (2)	2,390						
Australia . . . . .	...	...	(2)	236 (2)	227						
New Zealand . . .	...	...	(2)	236 (2)	227						
<i>Exporting Countries:</i>						<i>Exporting Countries:</i>					
India	547	408	3,353	5,276	6,658	India	333	1,050	4,845	7,483	9,828
Java and Madura .	...	...	...	...	...	Java and Madura .	...	...	(2)	8,120 (2)	10,804
Totals	234,346	269,668	2,169,937	2,693,565	3,195,914	Totals	53,244	58,339	648,628	663,632	897,445

1) (2) See notes page 237.

COUNTRIES	FEBRUARY		FIVE MONTHS (Oct. 1- Feb. 28)		TWELVE MONTHS (Oct. 1- Sept. 30)	COUNTRIES	FEBRUARY		SEVEN MONTHS (August 1-Feb. 28)		TWELVE MONTHS (August 1 July 31)
	1931	1930	1930-31	1929-30	1929-30		1931	1930	1930-31	1929-30	1929-1930
Cacao. (Thousand lbs.).						Total Wheat and Flour (*) (Thousand centals).					
EXPORTS.						a) NET EXPORTS					
Exporting Countries:						Exporting Countries:					
Grenada . . . . .	...	...	(1) 1,327	(1) 1,290	9,052	Bulgaria	9	(4) 941	(4) (4)		
Dominican Republ. . . . .	...	...	(2) 9,925	(2) 7,449	42,560	Spain	15	(4) 64	(4) (4)		
Brazil . . . . .	...	...	(1) 47,102	(1) 62,182	162,486	France	(4) 736	(4) (4)	(4) (4)		
Ecuador	3,201	1,263	12,846	10,942	39,399	Hungary	443	593	7,961	11,867	17,493
Trinidad	7,710	7,639	22,229	24,958	54,492	Lithuania	108	9	366	9	62
Venezuela . . . . .	...	...	(1) 4,597	(1) 6,105	38,773	Poland	187	64	1,713	(4) (4)	117
Ceylon	913	1,173	4,612	4,546	8,446	Rumania . . . . .	...	(1) 6,901	(1) 236	1,062	
Java and Madura	20	90	1,034	756	2,833	Yugoslavia	7	231	2,857	11,817	13,719
Cameroons . . . . .	...	...	(2) 17,483	(2) 14,932	24,654	Canada	7,249	5,262	100,485	62,354	110,381
Ivory Coast . . . . .	...	...	(2) 11,228	(2) 12,002	46,377	United States	1,470	4,523	39,840	56,229	83,081
Gold Coast	93,452	42,735	241,037	206,976	507,506	Argentina	9,910	6,790	26,888	64,441	90,361
Nigeria	22,018	23,459	88,942	80,560	116,449	Chile	29	11	545	148	728
St. Thomas and Principe	1,784	2,860	16,096	22,783	33,912	British India	(4) (4)	(4) (4)	(4) (4)	309	
Togoland . . . . .	...	...	(2) 6,614	(2) 7,262	14,357	Algeria . . . . .	...	(1) 4,766	(1) 1,030	2,765	
						Tunis	(4) 82	1,204	2,493	3,468	
						Australia . . . . .	...	(2) 30,100	(2) 14,888	36,680	
						Totals . . .	19,427	18,396	224,331	225,532	366,836
IMPORTS.						b) NET IMPORTS.					
Importing Countries:						Importing Countries:					
Germany	0	0	432	170	216	Germany	988	3,563	10,366	20,044	28,714
Belgium . . . . .	...	...	(2) 97	(2) 86	304	Austria	680	608	4,381	5,871	11,407
France	148	...	223	37	37	Belgium . . . . .	...	(2) 13,215	(2) 13,034	25,391	
Netherlands	1,231	862	5,617	6,241	10,070	Bulgaria	(5) 33	(5) (5)	869	855	
Poland	0	0	0	11	13	Denmark	346	243	3,726	2,873	4,654
Czechoslovakia	0	0	13	20	20	Spain	(5) 35	(5) (5)	2,023	2,053	
United States	1,045	425	3,768	3,404	8,955	Estonia	11	62	350	443	705
Australia . . . . .	...	...	(2) 31	(2) 106	276	Irish Free State . . . . .	...	(2) 6,074	(2) 5,366	10,291	
Totals . . .	131,572	80,512	494,333	564,163	1,122,061	Finland	115	104	1,967	2,110	3,320
						France	2,207	(5) 15,174	11,554	6,585	
						Gr. Brit. and N. Ir.	6,310	7,009	79,708	74,903	122,913
						Greece	1,014	977	7,652	7,551	12,998
						Italy	3,133	1,418	26,588	6,867	25,402
						Latvia	101	123	644	875	1,490
						Norway	247	326	3,069	2,414	4,048
						Netherlands	1,144	1,224	13,276	9,954	18,115
						Poland	(5) (5)	(5) (5)	141	(5) (5)	
						Portugal	64	110	302	822	3,935
						Sweden	194	463	2,138	2,941	4,365
						Switzerland	714	633	7,083	5,706	9,590
						Czechoslovakia	46	842	7,729	4,841	7,921
						Ceylon	37	51	379	360	575
						India	1,351	357	697	1,360	(5) (5)
						Indochina . . . . .	...	(2) 326	(2) 342	732	
						Japan	1,063	661	4,486	4,228	8,356
						Java and Madura . . . . .	...	(2) 611	(2) 650	1,523	
						Syria and Lebanon . . . . .	...	(2) 57	(2) 397	686	
						Egypt . . . . .	...	(2) 3,247	(2) 3,287	6,274	
						Tunis	35	(5) (5)	(5) (5)	(5) (5)	
						Union of South Afr. . . . .	...	(1) 842	(1) 1,482	2,582	
						New Zealand . . . . .	...	(2) 201	(2) 80	276	
Totals . . .	167,693	99,696	452,173	507,169	1,062,758	Totals . . .	19,996	18,762	314,297	194,195	325,436

(*) Flour reduced to grain on the basis of the coefficient: 1,000 centals of flour = 1,333.33 centals of grain.

a) Excess of exports over imports. — b) Excess of imports over exports.

1) Data up to 31st December. — (2) Data up to 31st January. — (3) Data up to 30th September. — (4) See Net Imports. — (5) See Net Exports.

STOCKS

STOCKS AND AVAILABLE SALEABLE SUPPLIES OF CEREALS AND POTATOES IN FARMERS' HANDS
IN GERMANY, ON MARCH, 15.

Products	% Stocks: total production				% Available saleable quantities: total production			
	15-III-31	15-II-31	15-III-30	15-III-29	15-III-31	15-II-31	15-III-30	15-III-29
Winter wheat	13.2	23.4	25.6	21.2	8.6	16.8	19.2	13.0
Spring wheat	30.3	50.5	32.4	39.6	17.8	37.3	24.8	30.7
Winter rye	25.8	35.2	31.3	28.3	11.5	17.0	15.9	13.6
Winter barley	11.4	16.7	19.4	14.5	1.6	2.0	3.3	1.2
Spring barley	16.4	20.3	25.8	25.4	0.7	10.5	12.9	11.3
Oats	44.8	54.1	46.2	46.8	0.7	13.3	14.9	13.4
Potatoes	32.8	40.9	35.9	39.9	8.8	11.9	10.1	13.1

Authority: Preisberichtstelle beim Deutschen Landwirtschaftsrat.

STOCKS IN ENGLAND AND WALES IN FARMERS' HANDS, ON APRIL, 1ST.

Products	% Stocks: total production				Estimated stocks in absolute figures							
					1-IV-31				1-IV-28			
	1-IV-31	1-IV-30	1-IV-29	1-IV-28	1-IV-31	1-IV-30	1-IV-29	1-IV-28	1-IV-31	1-IV-30	1-IV-29	1-IV-28
					1,000 centals				1,000 bushels (t)			
Wheat	19	17	13	16	4,502	4,861	3,808	4,973	7,504	8,101	6,347	8,288
Barley	12	16	11	10	2,016	3,517	2,419	1,971	4,200	7,327	5,040	4,107
Oats	21	21	16	17	6,294	7,123	5,309	5,130	19,670	22,260	16,590	16,030
Potatoes	15	28	20	13	9,318	22,310	15,456	9,117	15,551	37,184	25,780	15,106
Hay	25	15	15	17	43,658	18,122	21,840	23,046	2,183	906	1,092	1,197
Straw	21	19	19	21	17,020	18,144	18,650	21,347	806	907	833	1,067

(1) For hay and straw thousand short tons.

CANADA: STOCKS ON MARCH, 31ST AND PRODUCE OF MERCHANTABLE QUALITY.

Products	Stocks in Farmer's Hands			Total stocks			Produce of Merchantable quality		
	31-III-31	31-III-30	31-III-29	31-III-31	31-III-30	31-III-29	1930	1929	1928
1000 centals.									
Wheat	53,180	27,750	96,310	165,115	137,302	146,500	236,142	175,487	308,481
Rye	3,920	923	908	11,633	6,180	3,788	12,281	7,120	7,892
Barley	27,380	10,228	13,980	40,622	21,530	23,623	63,919	45,809	61,980
Oats	65,280	29,400	54,541	71,403	35,841	64,182	133,082	88,050	138,898
Flaxseed	...	115	184	1,566	684	960	2,431	1,092	1,870
Potatoes	...	10,832	17,516	18,280	...	...	45,081	33,186	39,874
1000 bushels.									
Wheat	88,633	46,250	60,517	275,101	228,837	244,267	393,570	292,478	505,718
Rye	7,000	1,649	1,443	20,774	11,036	6,671	21,931	12,715	14,038
Barley	57,000	21,308	29,084	84,830	44,354	49,215	133,183	95,435	129,083
Oats	192,000	92,063	170,442	210,273	105,416	200,567	416,250	275,158	432,479
Flaxseed	...	206	329	2,797	1,222	1,780	4,341	1,950	3,849
Potatoes	...	18,063	29,193	30,467	...	...	75,061	55,310	66,457

STOCKS OF WHEAT IN FARMERS' HANDS IN THE UNITED STATES, ON APRIL, 1ST.

	1-IV-1931	1-IV-1930	1-IV-1929	1-IV-1926-1930 Average
Thousand centals	69,000	61,200	70,800	58,200
Thousand bushels	115,000	102,000	118,000	97,000

VISIBLE SUPPLY OF CEREALS IN CANADA AND THE UNITED STATES (1).

PRODUCTS AND COUNTRIES	28-III-31	28-II-31	31-I-31	29-III-30	30-III-29	28-III-31	28-II-31	31-I-31	29-III-30	30-III-29
	1000 centals					1000 bushels				
WHEAT:										
Canada	108,150	110,220	116,315	115,632	109,006	180,250	183,700	183,858	192,754	181,076
United States . .	128,167	124,960	121,522	94,906	77,003	213,612	206,100	202,537	158,176	128,339
TOTAL . . .	236,317	235,080	237,837	210,538	186,000	393,862	391,800	386,395	350,930	310,015
RYE:										
United States . .	7,030	7,784	8,431	8,085	4,113	12,553	13,811	15,055	14,437	7,344
OATS:										
Canada	4,674	4,235	4,455	5,570	7,831	14,607	13,234	13,921	17,484	24,472
United States (2)	6,113	7,343	8,528	6,057	4,503	19,103	22,947	26,650	18,929	14,071
TOTAL . . .	10,787	11,578	12,983	11,636	12,334	33,710	36,181	40,571	36,363	38,543
BARLEY:										
Canada	12,962	13,038	14,422	12,618	9,461	27,004	29,037	30,045	26,287	19,711
United States (2)	3,763	4,600	5,151	3,762	4,060	7,840	9,583	10,731	7,837	8,459
TOTAL . . .	16,725	18,538	19,573	16,380	13,521	34,844	38,620	40,776	34,124	28,170
MAIZE:										
United States (2)	12,310	11,202	9,835	14,072	20,776	21,006	20,110	17,562	25,120	37,100

Authority: *Bradstreet's* (for rye: *Grain, Seed and Oil Reporter*).

(1) Grain stored at principal interior and seaboard points of accumulation and grain in transit by canals and lakes. — (2) East of Rocky Mountains.

GRAIN AND FLOUR STOCKS AT THE PORTS OF GREAT BRITAIN AND IRELAND (1).

PRODUCTS	1-IV-31	1-III-31	1-II-31	1-IV-30	1-IV-29	1-IV-31	1-III-31	1-II-31	1-IV-30	1-IV-29
	1000 centals					1000 bushels				
WHEAT:										
Grain	6,960	6,812	9,504	6,036	3,762	11,600	11,520	15,840	11,580	6,320
Flour as grain . .	578	884	912	888	672	960	1,440	1,520	1,480	1,120
TOTAL . . .	7,538	7,776	10,416	7,824	4,464	12,560	12,960	17,360	13,040	7,440
Maize.	1,728	2,448	2,856	1,968	3,264	3,068	4,371	5,100	3,514	5,829
Barley	1,100	1,360	1,840	1,080	1,200	2,292	2,838	3,833	2,250	2,500
Oats	1,024	1,104	1,312	672	640	3,200	3,450	4,100	2,100	2,000

Authority: *Broomhall's Corn Trade News*.

(1) Imported cereals.

STOCKS OF COTTON ON HAND IN THE UNITED STATES.

LOCATION	31-III-31	28-II-31	31-I-31	31-III-30	31-III-29	31-III-31	28-II-31	31-I-31	31-III-30	31-III-29
	1000 centals					1000 bales (counting round as half bales)				
In consuming establishments	7,072	7,407	7,723	8,583	8,378	1,478	1,548	1,614	1,763	1,731
In public storage and at compresses . .	31,787	35,045	37,988	20,417	15,587	6,643	7,324	7,939	4,189	3,219
TOTAL . . .	38,859	42,452	45,711	29,000	23,965	8,121	8,872	9,553	5,952	4,950

STOCKS OF COTTON AT BOMBAY AND AT ALEXANDRIA.

PORTS	2-IV-31	26-II-31	29-I-31	27-III-30	28-III-29	2-IV-31	26-II-31	29-I-31	27-III-30	28-III-29
	1000 centals					1000 bales (1 bale = 478 lbs.)				
Bombay (1)	3,693	3,815	3,244	5,149	4,724	773	798	679	1,077	988
Alexandria	(2) 5,081	5,151	5,298	(3) 3,020	8,086	(2) 1,063	1,078	1,108	(3) 820	616

Authorities: *East Indian Cotton Ass.* and *Alexandria General Produce Ass.*

(1) Stocks held by exporters, dealers and mills. — (2) April, 1st, 1931. — (3) April, 3rd, 1930.

STOCKS OF COTTON IN EUROPE.

COUNTRIES, PORTS, DESCRIPTIONS	2-IV-31	26-II-31	29-I-31	3-IV-30	28-III-29	2-IV-31	26-II-31	29-I-31	3-IV-30	28-III-29
	1000 centals					1000 bales (1 bale = 478 lbs.)				
<i>Great Britain</i> (1):										
American	2,593	2,780	2,879	2,165	3,672	543	581	602	453	766
Argentine, Brazilian, etc. . . .	212	204	183	* 700	172	44	43	39	146	36
Peruvian, etc. . . .	286	344	397	302	195	60	72	83	63	41
East Indian, etc. . . .	864	498	322	201	187	181	102	68	42	39
Egyptian, Sudanese	1,479	1,486	1,448	1,028	906	309	311	303	215	190
Other (2)	241	234	228	266	243	50	44	48	56	51
TOTAL . . .	5,675	5,536	5,462	4,662	5,375	1,187	1,168	1,143	975	1,125
<i>Bremen</i> :										
American	2,508	2,458	2,712	2,161	2,477	524	514	568	452	518
Other	36	58	73	30	17	8	12	15	6	4
TOTAL . . .	2,542	2,516	2,785	2,191	2,494	532	526	583	458	522
<i>Le Havre</i> :										
American	1,691	1,591	1,627	1,310	1,087	354	333	340	274	227
Other	155	164	169	127	70	33	34	36	27	15
TOTAL . . .	1,846	1,755	1,796	1,437	1,157	387	367	376	301	242
<i>Total Continent</i> (3):										
American	4,808	4,665	4,936	4,083	3,975	1,006	976	1,033	854	832
Argentine, Brazilian, etc. . . .	90	121	148	63	26	19	25	31	13	5
E. Indian, Australian, etc. . . .	219	195	210	100	145	46	41	44	21	30
Egyptian	102	104	145	101	60	21	22	30	21	13
W. Indian, W. African, E. African, etc. . . .	52	76	82	77	44	11	16	17	16	9
TOTAL . . .	5,271	5,161	5,521	4,424	4,250	1,103	1,080	1,155	925	889

Authority: *Liverpool Cotton Ass.*

(1) Data for following day. — (2) Includes: W. Indian, etc.; E. African, etc.; W. African, and Australian. — (3) Includes Bremen, Havre, and other Continental ports.

MONTHLY REVIEW OF PRICES (1)

PRODUCTS, MARKETS AND DESCRIPTIONS	Average (2)										Commercial Season	
	April 17, 1931	April 10, 1931	April 3, 1931 (3)	March 27, 1931	March 20, 1931	March 13, 1931	April 1930	April 1929	1929-30	1928-29		
WHEAT.												
Winnipeg: No. 1 Manitoba (cents p. 60 lbs.) . . .	62 1/4	58	55 1/4	56 1/4	57 1/4	56 1/4	110 1/2	123			124 1/4	124
Chicago: No. 2 Hard Winter (4) (cents p. 60 lbs.) .	83 1/4	82 1/2	81 1/2	79 1/4	79 1/4	79 1/4	108	119 1/4			114 1/4	119 1/4
Minneapolis: No. 1 Northern (cents p. 60 lbs.) . .	80 1/4	78 1/4	78 1/4	77 1/4	76 1/2	76 1/4	108 1/2	115			117 1/2	115 1/4
New York: No. 2 Hard Winter (4) (cents p. 60 lbs.)	n. q.	n. q.	n. q.	n. q.	n. q.	n. q.	113	130 1/4			121 1/4	131 1/2
Buenos Aires (a); Barletta (80 kg. p. hectol. — pesos paper per quintal)	5.75	5.46	5.40	5.40	5.50	5.61	10.65	9.69			10.65	9.93
Karachi: Karachi white, 2 % barley, 1 1/2 % dirt (rupees per 656 lbs.)	18-13-0	19-5-0	19-3-0	19-10-0	19-10-0	19-8-6	33-2-6	n. q.			36-0-9	43-13-7
Berlin: Home grown (Reichsmarks p. quintal) . . .	28.85	28.85	28.70	28.20	27.85	28.66	20.87	22.50			25.33	21.83
Hamburg, c. i. f. (Reichsmarks p. quintal): . . .												
No. 3 Manitoba	(5)12.51	(5)11.76	(5)11.59	(5)11.84	(5)11.91	(5)12.03	19.30	21.44			21.30	21.59
No. 2 Hardwinter	n. q.	n. q.	n. q.	n. q.	n. q.	n. q.	18.56	20.88			19.49	20.96
Barusso (79 kg. p. hectol.)	10.46	9.41	9.24	9.15	9.71	9.71	(6)18.02	19.27			18.72	19.96
Antwerp (Belgian francs p. quintal):												
Home grown . . . . .	...	86	86	87	93 1/2	89	147 1/2	162 1/2			154 1/4	102 1/4
No. 2 Hard Winter, Gulf . . . . .	...	109	113	122	128 1/2	124 1/2	162	...			171	...
Paris: Home grown, 75-77 kg. (francs p. quintal) .	186.00	182.90	183.75	185.25	181.75	181.25	132.35	155.50			139.40	156.35
London: Home grown (shillings per 504 lbs.) . .	22/-	22/-	n. q.	22/6	22/6	22/6	39/4	43/8			40/10	43/6
London and Liverpool c. i. f., shipping current month (shillings p. 480 lbs.):												
South Russian (on sample)	n. q.	n. q.	n. 19/9	20/-	20/3	20/4	n. q.	n. q.			n. q.	n. q.
No. 3 Manitoba	(7) 24/3	(7) 22/3	(7) 22/3	(7) 22/6	24/-	23/3	41/1	45/-			46/2	45/6
No. 2 Hard Winter (4)	n. q.	n. q.	n. q.	n. q.	*24/10 1/2	24/8	30/7	43/6			41/5	43/3
White Pacific	n. q.	n. q.	n. q.	n. q.	n. q.	n. q.	40/11	44/2			42/3	46/-
Rosafé (63 1/2 lbs.), adfloat	(9) 21/9	(9) 20/1 1/2	(9) 19/9	(9) 19/9	(9) 20/-	(9) 20/1	(10) 38/5	40/10			40/3	42/3
Choice White Karachi	n. q.	n. q.	n. q.	n. q.	n. q.	n. q.	40/11	n. q.			42/2	n. q.
Australian	22/8	21/8	20/10 1/2	21/-	(11) 22/-	21/4	40/7	44/11			43/6	45/11
Milan (b): Home grown, soft (liras p. quintal) . .	108.50	105.50	102.50	102.50	103.50	104.25	135.75	135.25			131.80	131.40
Genoa c. i. f. (shillings p. metric ton): La Plata .	...	98/-	n. 93/6	n. 91/6	n. 94/-	n. 94/10	177/4	193/10			184/6	192/10
RYE.												
Minneapolis: No. 2 (cents per 56 lbs.)	36 1/4	34 1/2	34 1/2	35 1/2	37 1/2	36 1/4	71 1/4	94 1/4			80 1/4	90
Berlin: Home grown (Reichsmarks per quintal) . .	19.20	18.90	19.60	18.40	17.80	17.92	16.60	20.74			17.04	20.47
Hamburg c. i. f.: La Plata, 74-75 kg. (R. M. p. 100 kg.)	n. q.	n. q.	n. q.	n. q.	n. q.	n. q.	(11) 13.38	20.35			14.57	19.72
Groningen (c): Home grown (forins per quintal) .	4.25	4.00	3.95	4.50	4.00	3.91	5.97	10.20			6.38	9.74
BARLEY.												
Winnipeg: No. 4 Western (cents p. 48 lbs.) . . .	27 1/4	24 1/4	23 1/4	21 1/4	23 1/4	22 1/4	45	68 1/2			51 1/4	67 1/4
Chicago: Feeding (cents per 48 lbs.)	41	44	46	50	50	44	57 1/2	54 1/2			57 1/4	56 1/4
Berlin: Home grown, fodder (Reichsmarks per quintal)	23.50	22.10	21.85	21.85	21.40	21.21	18.25	19.70			17.40	19.73
Antwerp: Danube (francs per quintal) . . . . .	...	78	76	75	74	72	90	150 1/2			107 1/2	164 1/2
London: English malting (shillings p. 448 pounds).	32/6	35/-	n. q.	40/-	40/-	40/-	34/4	42/4			39/-	47/8
London and Liverpool, c. i. f., parcels (shillings per 400 lbs.):												
Danubian 3 %	17/6	(11) 15/3	(11) 15/-	15/-	15/9	15/4	19/7	34/6			22/3	32/6
Russian (Azoff-Black sea)	n. q.	n. q.	n. q.	n. q.	n. q.	n. q.	19/7	n. q.			18/11	n. q.
Canadian Western, No. 4	(13) 16/6	(13) 14/6	*14/7 1/2	(13) 15/-	(13) 15/6	(13) 15/4	(13) 24/2	30/9	n.		25/10	29/4
California malting (shillings p. 448 lbs.) . . .	28/-	26/-	24/-	23/6	23/6	23/7	30/-	40/-			32/6	39/9
Moroccan	n. q.	n. q.	n. q.	n. q.	n. q.	n. q.	n. q.	29/-	n.		24/2	29/8
Groningen (c): Home grown winter (fl. p. quintal)	5.25	4.85	4.80	4.80	4.85	4.70	6.80	10.11			7.55	9.97

(a) Thursday prices. - (b) Saturday prices. - (c) Prices of preceding Tuesday.

(1) All quotations are, unless otherwise stated, for spots. - (2) The monthly averages are based on Friday quotations, the annual averages on the monthly. - (3) Owing to Good Friday, in most cases Thursday quotations have been substituted. - (4) Quoted formerly as No. 2 Winter. - (5) No. 2 Manitoba. - (6) 78 kg. per hectolitre. - (7) Shipping April, from Vancouver. - (8) No. 1 Hard Winter. - (9) 65 lbs. per bushel. - (10) 61 1/2 lbs. per bushel. - (11) Shipping May. - (12) 73 kg. per hectolitre. - (13) No. 3 Western.

PRODUCTS, MARKETS AND DESCRIPTION	April 17, 1931	April 10, 1931	April 3, 1931 (2)	March 27, 1931	March 20, 1931	Average (1)					
						March 1931	April 1930	April 1929	Commercial Season	1929-30	1928-29
OATS.											
Winnipeg: No. 2 White (cents per 34 lbs.) . . .	29 1/4	27 1/4	25 1/4	27 1/4	27 1/4	27 1/4	54 1/4	58 1/4	58 1/4	58 1/4	58 1/4
Chicago: No. 2 White (cents per 32 lbs.) . . .	32	31	30 1/2	32 1/2	32	32	44 1/2	49 1/4	44 1/4	47 1/4	47 1/4
Buenos Aires (a): Current quality (pesos paper per quintal) . . .	3.50	3.20	3.05	3.00	3.15	3.14	4.66	7.44	5.80	7.71	7.71
Berlin: Home grown (Reichsmarks per quintal) . . .	18.20	17.10	16.70	16.30	15.70	15.77	16.47	20.32	15.62	19.08	19.08
Paris: Home grown, black and other (francs per quintal) . . .	92.50	87.10	83.75	81.25	81.50	79.87	71.44	134.87	81.15	127.85	127.85
London: Home grown white (shillings per 336 lbs.) . . .	17/6	17/6	n. q.	17/6	17/6	17/6	18/9	20/3	21/-	28/3	28/3
London and Liverpool c. i. f., parcels (shillings p. 320 lbs.) . . .	n. q.	n. q.	n. q.	n. q.	n. q.	n. q.	n. 14/3	n. q.	(3) n. 16/4	n. q.	n. q.
Danubian (39-40 lbs.) . . .	10/9	10/3	9/4 1/2	9/6	9/10 1/2	9/10	14/5	23/9	16/1	28/9	28/9
Plate (f. a. q.) . . .	n. q.	n. q.	n. q.	n. q.	n. q.	n. q.	n. q.	24/2	n. q.	24/2	24/2
White clipped American . . .	12/3	10/9	10/9	11/-	11/-	10/10	14/10	28/11	17/3	21/2	21/2
Chilian Tawny . . .											
Milan (b): spot (liras per quintal):											
Home grown . . .	73.50	73.50	73.50	73.50	73.50	73.50	76.00	99.35	80.75	103.80	103.80
Foreign imported . . .	60.00	55.00	54.00	55.00	54.50	55.00	68.00	93.00	74.25	98.90	98.90
MAIZE.											
Bralla: Danube (lei per quintal) . . .	...	230	220	222	234	227	325	829	309	687	687
Chicago: No. 2 Mixed American (cents per 56 lbs.) . . .	80 1/2	80	59 1/2	61 1/4	62 1/4	61 1/4	83 1/4	91	85 1/4	94 1/4	94 1/4
Buenos Aires (a): Yellow Plate (pesos paper per quintal) . . .	3.50	3.45	3.70	3.85	4.20	4.04	6.47	8.00	6.17	8.85	8.85
Antwerp, spot (Belgian francs per quintal):											
Bessarabian . . .	...	78	79	79	78 1/2	74	n. q.	n. q.	n. 97 1/4	n. q.	n. q.
Cinquantino . . .	...	93	92	95	94	4) 94	134 1/2	101 1/4	131 1/4	173	173
Yellow Plate . . .	...	76	78	80	78	74	125 1/2	160	109 1/4	155 1/4	155 1/4
London and Liverpool, parcels, c. i. f. (shillings per 480 lbs.):											
Danube . . .	10/10 1/2	5) 18/6	5) 18/3	5) 18/3	5) 19/-	5) 18/6	25/1	n. q.	24/11	n. q.	n. q.
Yellow Plate . . .	18/6	18/6	18/6	18/3	19/3	18/2	27/5	30/-	25/3	38/3	38/3
No. 2 White African . . .	6) 18/6	6) 19/-	6) 19/-	6) 19/-	n. q.	n. q.	28/1	n. q.	26/-	38/8	38/8
Milan (b): Home grown (liras per quintal) . . .	51.50	50.50	50.50	50.50	50.50	50.00	70.00	103.50	71.35	97.00	97.00
RICE (CLEANED).											
									1930	1929	
Milan (b): Maratelli (lire per quintal) . . .	122.00	115.00	115.00	115.00	110.00	111.25	109.35	197.25	152.15	165.70	165.70
Rangoon: No. 2 Burma (rupees per 7500 lbs.) . . .	230	240	245	260	250	246	440 1/4	430 1/4	393 1/4	462 1/4	462 1/4
Saigon (Indochinese piastres (p. quintal):											
No. 1 Round white (25 % broken) . . .	6.18	6.18	6.59	6.92	7.08	7.02	13.13	10.06	11.36	11.58	11.58
No. 2 Japan (40 % broken) . . .	5.60	5.52	5.80	6.18	6.38	6.32	12.60	9.64	10.89	11.08	11.08
London (a): c. i. f. (shillings per 112 lbs):											
Spanish Belloch, No. 3 oiled . . .	12/-	12/5 1/4	12/4	12/-	11/0	12/1	14/9	18/5	14/1	17/11	17/11
Italian good, No. 6 oiled . . .	14/-	13/4 1/2	13/4 1/2	13/9	13/-	13/1	15/11	19/7	14/11	18/9	18/9
American Blue Rose . . .	17/8	17/8	17/8	17/8	18/3	18/4	23/6	21/6	21/9	21/10	21/10
Burma, No. 2 . . .	7/5 1/4	7/7 1/2	7/7 1/2	7/11	7/10	7/11	12/-	12/9	10/11	13/2	13/2
Saigon, No. 1 . . .	7/8	7/3	7/7 1/2	7/8	8/-	7/11	12/8	12/7	11/8	13/3	13/3
Siam, Garden, No. 1 . . .	9/1 1/2	9/3	9/4 1/2	9/4 1/2	9/6	9/5	15/4	15/-	14/-	15/1	15/1
Tokio: Various qualities (yens per koku) . . .	18.00	18.20	18.60	18.20	18.20	18.00	27.22	29.47	26.57	29.06	29.06
LINSEED.											
Buenos Aires (a): Current quality (pesos paper per quintal) . . .	10.45	10.15	10.25	10.40	10.70	10.82	19.79	15.46	17.19	18.20	18.20
Antwerp: Plate (Belgian francs p. quintal) . . .	...	155	158	167	173	175	820 1/4	270 1/4	284 1/4	318 1/4	318 1/4
Hull, c. i. f.: Plate (p. sterling p. l. ton) . . .	18-17-6	8-17-6	9-0-0	9-2-6	9-7-6	9-6-3	18-0-0	15-17-6	15-0-6	18-5-0	18-5-0
London, c. i. f.: Bombay hold (p. st. per long ton) . . .	n. q.	n. q.	n. q.	n. 12-5-0	12-15-0	12-12-6	20-4-4	18-13-9	17-14-4	20-16-1	20-16-1
Duluth: No. 1, Northern (cents p. 56 lbs.) . . .	(8) 158	(8) 155	(8) 153	(8) 154 1/4	(8) 157 1/4	(8) 157 1/4	285 1/2	240 1/4	280	278 1/4	278 1/4

(a) Thursday prices. — (b) Saturday prices.

(1) The monthly averages are based on Friday quotations, the annual averages on the monthly. — (2) Owing to Good Friday in most cases Thursday quotations have been substituted. — (3) Weight not indicated. — (4) March, 6: 94; March, 13: 95. — (5) Maine Galt-Fox. — (6) White East African. — (7) Actual rate of change: 1 piastre = 58 1/4 francs. — (8) May delivery.

PRODUCTS, MARKETS AND DESCRIPTION	April 17, 1931	April 10, 1931	April 3, 1931 (2)	March 27, 1931	March 20, 1931	Average (1)				Commercial Season	
						March 1931	April 1930	April 1929		1929-30	1928-29
COTTONSEED.											
Alexandria : Sakellaris (piastres per ardeb) . . .	59.0	58.1	58.0	60.0	61.0	60.8	73.7	91.0		67.9	95.4
Hull : Sakellaris (p. sterl. per long ton) . . .	6-6-3	6-0-0	6-3-0	7-5-0	6-12-6	6-15-7	7-8-9	8-10-1		6-18-2	9-12-2
COTTON.											
New Orleans : Middling (cents per lb.)	9.90	9.93	10.25	10.59	10.55	10.56	15.83	19.24		16.17	18.08
New York : Middling (cents per lb.)	10.15	10.20	10.50	10.85	10.90	10.89	16.42	20.35		16.60	19.09
Bombay : M. g. Broach f. g. (rupees per 784 lbs.) .	195	194	198	204	206	207	261	348		282 1/2	346 1/4
Alexandria (a) (talaris per kantar) :											
Sakellaris f. g. f.	15.82	15.27	16.82	16.97	18.02	17.88	27 1/4	35 1/4		28 1/2	35 1/4
Ashmouni (Upper Egypt) f. g. f.	11.50	11.35	12.15	12.50	12.85	12.80	19 1/4	23 1/4		19 1/4	22 1/4
Bremen : Middling (U. S. cents per lb.)	11.36	11.35	n. q.	11.98	12.15	(3) 12.18	17.78	21.38		18.27	21.10
M. g. Broach fully good (pence per lb.)	n. 4.30 n.	4.30 n.	4.30 n.	5.10 n.	5.05	n. 5.11 n.	6.11 n.	8.39 n.		6.83 n.	8.27
Le Havre : Middling, Gulf (francs per 50 kilogr.) .	...	347	364	369	372	373	520	633		545	624
Liverpool (pence per lb.) :											
Middling fair	n. 6.75 n.	6.79 n.	6.96 n.	7.05 n.	7.15 n.	7.16 n.	10.09 n.	11.88 n.		10.39 n.	11.69
Middling	5.55	5.50	5.76	5.85	5.95	5.96	8.74	10.63		9.09	10.53
São Paulo good fair	5.75	5.79	5.96	6.05	6.25	6.24	8.61	11.00		9.02 n.	10.91
M. g. Broach fully good	n. 4.32 n.	4.25 n.	4.25 n.	4.45 n.	4.56 n.	4.56 n.	6.15 n.	8.72 n.		6.80 n.	8.68
Sakellaris fully good fair	8.50	9.00	9.20	9.45	9.80	9.66	14.20	18.52		14.52	18.17
BUTTER.											
										1930	1929
Copenhagen (a) (Kr. p. 100 kg.) . . . . .	...	200	205	205	218	222	225	270		245	303
Maastricht, auction (b) : Dutch (florins p. 50 kg.)	...	1.46	1.45	1.46	1.57	1.56	1.56	1.86		1.70	2.09
Hamburg, auction (b) : Schleswig-Holstein butter, with quality mark (R. M. per 50 kg.)	128.73	128.75	129.40	134.16	141.50	143.31	135.55	156.12		146.67	178.03
Kempten (b) : Allgäu butter (Pfennige p. half kg.)	109	112	112	117	127	124	123	146		128	159
London (c) (shillings p. cwt.) :											
British blended	144/8	144/8	144/8	144/8	144/8	144/8	158/8	186/8		158/8	196/-
Danish	126/-	130/-	132/-	140/-	146/-	145/6	147/6	172/-		153/6	186/6
Irish creamery, salted	n. q.	n. q.	n. q.	n. q.	n. q.	n. q.	n. q.	170/8		134/10	179/4
Dutch	126/-	130/-	132/-	140/-	144/-	144/6	148/-	165/9		151/11	182/4
Argentine	116/-	118/-	122/-	124/-	127/-	127/-	135/-	165/6		135/10	174/1
Siberian	n. q.	n. q.	n. q.	n. q.	n. q.	n. q.	132/-	n. q.		...	167/2
Australian, salted	114/-	116/-	120/-	122/-	126/-	125/-	130/6	161/6		135/9	176/-
New Zealand, salted	116/-	118/-	121/-	122/-	128/-	126/6	133/6	168/6		137/8	178/9
CHEESE.											
Milan (lire per quintal) :											
Parmigiano-Reggiano, 1st quality of last year's production	1,112	1,112	1,112	1,112	1,112	1,112	1,119	1,050		1,160	1,074
Green Gorgonzola, mature, choice	635	655	655	655	660	659	702	862		671	829
Rome : Roman pecorino (lire p. quintal)	1,100	1,100	1,050	1,050	1,050	1,050	1,238	1,675		1,207	1,546
Alkmaar : Edam 40 + 40% butterfat, with the country's cheesemark, factory cheese, small florins, p. 50 kg.) . . . . .	...	32.00	33.50	33.50	35.50	35.50	39.00	41.87		40.88	47.10
Gouda (s) : Gouda 45 + (whole milk cheese, with the country's cheesemark, home made; florins, p. 50 kg.) . . . . .	...	34.50	37.00	39.50	40.50	(6) 40.25	41.12	42.87		45.56	52.45
Kempten (b) : (Pfennige per half kg.) :											
Softcheese, green (20 % butterfat)	21 1/2	21 1/2	21 1/2	21 1/2	23 1/2	23	24 1/2	28		27	35
Emmenthal from the Allgäu (whole milk cheese) 1st quality	98 1/2	98 1/2	98 1/2	98 1/2	98 1/2	98 1/2	(7) 100	(7) 112		(7) 97	(7) 107
London (c) (shillings per cwt.) :											
English Cheddar	108/-	108/-	108/-	106/-	106/-	104/-	118/6	138/-		108/4	121/9
Canadian	80/-	80/6	80/6	81/-	81/6	81/6	104/-	118/4		98/11	107/8
New Zealand	56/6	57/-	59/-	61/-	62/-	61/9	81/9	93/1		82/2	95/5
Liverpool (a) : Engl. Cheshire, ungraded (sh. p. cwt.)	100/4	105/-	114/4	114/4	119/-	115/6	87/6	108/6		96/5	111/9

(1) Thursday prices. — (2) Wednesday prices. — (3) Average prices for weeks ending on preceding Wednesday.

(4) The monthly averages are based on Friday quotations, the annual averages on the monthly. — (5) March, 6: 12.98; March, 13: 12.30. — (6) March, 6: n. 5.15; March, 13: n. 5.15. — (7) Indicated formerly as: Bodegraven. — (8) March, 13: 40.30. — (9) Average price for all qualities.

QUARTERLY REVIEW OF PRICES (I)

Groups	COUNTRIES AND PRODUCTS	Average							
		III	II	I	X-XII	I-III	I-III	Agricultural year (2)	
		1931	1931	1931	1930	1930	1929	1929-30	1928-29
GERMANY (Prices in Reichsmarks per quintal).									
A I	Wheat (Berlin)	28.66	27.42	25.82	24.14	24.00	21.58	25.00	21.80
	Rye (Berlin)	17.92	15.79	15.58	15.15	15.60	20.62	17.27	21.00
	Barley, feeding (Berlin)	21.21	19.77	19.25	17.99	15.07	19.68	17.43	19.97
	Oats (Berlin)	15.77	14.35	14.22	14.52	13.27	20.21	15.77	20.51
	Potatoes (Berlin)	2.88	2.70	2.60	2.66	4.12	5.48	3.63	5.14
A II	Milk, fresh (Berlin)	18.22	18.42	17.79	17.08	15.00	17.33	16.69	18.40
	Butter (Hamburg)	286.62	309.24	282.54	290.09	324.97	369.40	390.08	363.62
	Cheese, Emmentaler variety (Kempten)	197	197	197	182	204	212	205	221
	Beef (Berlin) (3)	94.84	99.60	109.60	111.60	112.80	111.70	114.84	114.20
	Veal (Berlin) (3)	114.24	101.60	115.20	143.33	137.26	132.60	143.02	137.60
	Pork (Berlin) (3)	93.74	101.60	114.40	121.07	152.50	150.20	154.09	148.20
B I	Basic slag (Aachen) (4) . . . . .	...	0.32	0.32	0.32	0.32	0.32	0.31	0.30
	Superphosphate of lime 18 % . . . . .	...	6.62	6.44	6.48	6.65	6.29	6.51	6.16
	Potash salts 18-22 % (4) . . . . .	...	0.152	0.152	0.152	0.152	0.152	0.152	0.152
	Sulphate of Ammonia (4) . . . . .	...	0.86	0.84	0.82	0.90	0.95	0.86	0.92
	Nitrate of lime (B. A. S. F.) (4) . . . . .	...	...	...	0.99	1.06	1.13	1.05	1.13
B II	Wheat bran (Hamburg)	12.08	10.44	9.22	8.14	8.02	13.94	9.33	13.65
	Linseed cake (Hamburg)	15.54	15.52	15.82	15.39	19.08	24.94	21.08	23.80
	Coconut cake (Hamburg)	14.50	12.84	12.64	12.70	14.82	20.82	16.94	21.16
	Rapeseed cake (Hamburg)	n. q.	n. q.	9.70	8.57	14.22	20.38	16.59	19.36
	Groundnut cake (Hamburg)	13.50	12.00	11.86	11.83	15.20	22.94	17.55	22.18
	Crushed soya extraction residue (Hamburg)	15.04	13.78	13.22	12.85	14.26	22.54	16.59	21.22
DENMARK (Prices in Danish crowns per quintal).									
A I	Wheat (Copenhagen)	10.67	10.17	10.37	11.12	15.20	17.04	16.08	16.74
	Rye (Copenhagen)	n. q.	7.50	n. q.	n. q.	11.62	16.93	12.80	16.48
	Barley (Copenhagen)	10.58	10.25	10.37	10.80	13.21	16.60	14.13	16.60
	Oats (Copenhagen)	11.67	10.92	11.00	10.83	11.23	16.94	16.09	17.32
A II	Butter (Copenhagen)	222	243	220	231	270	314	280	311
	Eggs	94	113	135	176	133	159	149	159
	Pork (3)	86	84	88	97	157	150	155	153
B I	Superphosphate 18 %	5.95	5.95	5.90	5.79	6.40	6.01	6.22	5.99
	Potash salts 40 %	12.95	12.95	12.95	12.71	13.30	13.30	13.05	13.44
	Sulphate of ammonia	17.65	17.65	17.45	16.88	19.10	20.10	18.55	20.10
	Nitrate of lime, Norwegian	16.85	16.85	16.75	16.10	16.95	15.50	16.47	15.60
B II	Maize, Plate (Copenhagen)	8.27	7.60	7.32	9.43	12.05	18.44	13.47	17.41
	Wheat bran (Copenhagen)	9.70	9.10	8.87	8.46	10.59	15.85	11.49	15.05
	Cotton seed cake (Copenhagen)	14.32	13.85	14.17	14.49	17.91	22.12	18.90	22.06
	Sunflower seed cake (Copenhagen)	11.80	12.17	13.10	13.11	14.35	21.78	15.95	21.14
	Groundnut cake (Copenhagen)	13.00	12.07	11.97	12.30	15.46	22.32	17.27	21.37
	Crushed soya extraction residue (Copenhagen)	14.07	13.50	12.55	12.60	14.28	20.64	16.00	19.57

(1) Each quarter a list will be published for several countries of prices of products of the soil (A I) and of livestock (A II) sold by the farmer, as well as of fertilisers (B I), and of concentrated feeding stuffs for livestock (B II) bought by the farmer.

In the case where the market is not indicated, the price is the average one for the country. — The prices paid to farmers for sugar beet are generally fixed once for the year and therefore are not inserted in these tables.

2) July to June. — (3) Live weight. — (4) Prices per unit per quintal.

Groups	COUNTRIES AND PRODUCTS	Average							Agricultural year	
		III	II	I	X-XII	I-III	I-III			
		1931	1931	1931	1930	1930	1929	1929-30	1928-29	
FRANCE (Prices in francs per quintal).										
A I	Wheat (Paris)	181.25	176.75	173.10	166.90	133.20	157.70	139.70	155.96	
	Rye (Paris) (1)	n. q.	n. q.	n. q.	n. q.	n. 76.35	n. 130.00	n. 87.70	n. 130.00	
	Barley (Paris) (1)	n. 82.00	n. 83.75	84.80	n. 73.80	n. 80.55	n. 140.10	92.59	134.86	
	Oats (Paris)	79.85	79.75	74.75	74.00	72.75	125.30	90.22	130.79	
	Wine, red (southern markets) (2) . . . . .	...	155	156	172	79	143	80	154	
A II	Beef (Paris) (1) (3)	984	1,042	1,100	1,078	870	815	916	790	
	Pork (Paris) (1) (4)	591	602	648	695	889	743	851	761	
	Mutton (Paris) (1) (3)	1,493	1,516	1,568	1,521	1,500	1,399	1,452	1,325	
B I	Basic slag, 18 % (Lorraine)	25.20	25.20	25.20	25.20	26.10	25.20	25.05	24.10	
	Superphosphate 14 % (North and East)	30.40	30.40	30.40	31.40	31.75	30.00	31.61	29.15	
	Sylvinit, minimum 12 %	10.60	10.60	10.60	10.60	10.05	10.05	10.89	10.05	
	Nitrate of soda (Dunkirk)	112.00	111.50	...	108.00	118.15	127.00	115.71	124.83	
	Sulphate of ammonia 20.4 %	115.50	115.50	...	111.50	120.30	126.00	118.85	122.81	
B II	Linseed cake (North) (1)	107	107	...	97	120	151	120	145	
	Coconut cake (Marseilles) (1)	70	66	...	70	96	126	102	129	
	Groundnut cake (Marseilles) (1)	82	80	...	91	110	148	116	146	

GREAT BRITAIN (A: Prices in shillings and pence per cwt;

B: Prices in pounds sterling, etc. per long ton).

A I	Wheat	5/1	5/-	5/0	6/10	9/4	9/11	9/8	10/-	
	Barley	5/9	5/8	5/6	5/8	6/10	9/7	7/8	9/10	
	Oats	6/3	6/-	6/-	6/1	6/6	10/3	7/6	10/2	
	Potatoes (London)	6/10	6/10½	7/1 ½	5/11	3/5	5/9	4/-	5/10	
A II	Butter (London)	144/8	141/2	135/4	144/7	180/5	204/6	177/4	205/4	
	Cheese, Cheddar (London)	104/-	97/-	95/-	96/2	113/3	130/-	109/1	135/10	
	Beef (London) (3)	77/-	75/3	76/5	74/11	86/6	81/2	82/10	80/6	
	Mutton (London) (3)	96/10	101/6	100/11	107/4	111/-	107/9	109/8	107/4	
	Pork (London) (3)	89/2	103/10	108/6	112/9	135/4	107/11	120/2	103/10	
B I	Basic slag 14 % (London)	2- 3- 0	2- 3- 0	2- 3- 0	2- 3- 0	2- 3- 0	2- 2- 0	2- 3- 1	2- 5- 0	
	Superphosphate, 16 % (London)	3- 1- 0	3- 1- 0	3- 6- 0	3- 6- 0	3- 6- 0	3- 6- 0	3- 6- 0	3- 3- 0	
	Kainit 14 % (London)	3- 3- 0	3- 3- 0	3- 5- 0	3- 1- 5	3- 3- 0	3- 3- 0	3- 1- 2	3- 0- 0	
	Nitrate of soda, 15 ½ % (London)	10- 0- 0	10- 0- 0	9- 18- 0	9- 12- 0	10- 1- 0	10- 10- 0	9- 18- 4	10- 9- 0	
	Sulphate of ammonia 20.6 % (London)	9- 10- 0	9- 10- 0	9- 8- 0	9- 3- 0	10- 1- 0	10- 12- 0	9- 18- 4	10- 9- 0	
B II	Bran, British (London)	5- 3- 9	4- 12- 0	5- 1- 0	4- 18- 8	5- 8- 9	7- 16- 0	5- 13- 10	7- 10- 0	
	Bran, middlings, imported (London)	4- 0- 0	4- 3- 3	4- 10- 0	4- 12- 6	5- 0- 8	7- 14- 0	5- 12- 1	7- 15- 0	
	Linseed cake, English (London)	9- 11- 3	9- 10- 0	9- 9- 0	9- 16- 7	12- 14- 4	13- 17- 0	12- 19- 5	13- 13- 0	
	Cottonseed cake (London)	5- 8- 6	5- 0- 6	4- 14- 9	4- 7- 6	6- 3- 8	7- 19- 0	6- 11- 7	7- 19- 0	
	Coconut cake (London)	n. q.	n. q.	n. q.	n. q.	n. 10-3-0	11- 5- 0	10- 8- 8	11- 2- 0	
	Palm kernel cake (Liverpool)	n. q.	n. q.	n. q.	5- 7- 5	8- 3- 0	9- 16- 0	8- 8- 4	9- 12- 0	

ITALY (Prices in lire per quintal).

A I	Wheat, soft (Milan)	104.25	107.85	104.20	110.80	133.10	136.40	131.45	131.18	
	Wheat, hard (Palermo)	136	132	122	131	145.30	145.15	141	143	
	Oats (Milan)	73.50	73.50	73.50	76.00	82.80	100.20	82.18	104.69	
	Maize (Milan)	50.00	49.50	48.70	54.25	73.55	106.85	77.85	105.09	
	Rice (Milan)	111.25	110.00	107.70	119.65	173.15	195.25	181.22	187.04	
	Hemp, fibre (1) . . . . .	...	176	215	256	398	527	461	524	
	Olive oil (Milan)	610	610	612	627	514	798	573	816	
	Wine, ordinary, 11° to 13° (Bari) (2)	107	111	115	121	128	152	136	155	

(1) New series. — (2) Price per hectolitre. — (3) Dead weight. — (4) Live weight.

Groups	COUNTRIES AND PRODUCTS	Average							Agricultural year	
		III	II	I	X-XII	I-III	I-III	1929-30	1928-29	
		1931	1931	1931	1930	1930	1929			
ITALY (continued)										
A II	Cheese Reggiano (Milan)	1,112	1,100	1,100	1,067	1,133	1,043	1,128	1,186	
	Eggs, fresh (Milan) (1)	4.15	4.75	6.13	7.73	5.33	8.16	6.26	7.46	
	Beef (Milan) (2)	380	387	396	434	470	489	480	478	
	Pork (Milan) (2)	405	410	423	474	633	724	637	722	
B I	Basic slag 16-20 % (Chiasso) (3)	1.35	1.35	1.37	1.37	1.42	1.60	1.43	1.46	
	Superphosphate, mineral, 15-17 % (Genoa) (3)	1.17	1.17	1.25	1.30	1.30	1.30	1.30	1.30	
	Chloride of potassium (Genoa)	78.00	78.00	79.25	80.50	84.00	83.00	83.52	83.00	
	Sulphate of ammonia (Genoa)	77.25	79.00	79.90	86.75	93.04	95.96	91.27	95.76	
	Copper sulphate (Genoa)	174	176	179	187	232	253	223	228	
B II	Wheat bran (Genoa)	41	43	45	45	58	75	58	72	
	Rice bran (Milan)	37	35	32	36	57	72	57	72	
	Linseed cake (Milan)	64	63	60	66	104	110	90	105	
	Groundnut cake (Milan)	52	52	50	55	79	95	82	96	
	Rapeseed cake (Milan)	32	32	32	36	60	78	66	74	
NETHERLANDS (Prices in guilders per quintal).										
A I	Wheat (Groningen)	6.08	5.35	6.18	6.26	8.50	10.05	9.60	10.50	
	Rye (Groningen)	3.90	3.82	4.31	4.50	5.80	9.76	6.72	10.00	
	Barley (Groningen)	4.69	4.50	4.69	4.59	6.72	9.92	7.93	10.25	
	Oats (Groningen)	4.59	4.52	4.83	5.23	5.03	9.22	6.16	9.75	
	Peas (Rotterdam)	8.75	8.12	8.00	10.02	9.60	17.22	12.02	18.31	
	Flax, fibre (Rotterdam)	62	61	60	n. 67	96	130	109	125	
	Potatoes (Amsterdam) (4)	6.15	5.50	4.60	3.98	2.28	4.32	2.64	3.50	
A II	Butter (Maastricht)	156	168	162	163	196	218	194	212	
	Cheese, Gouda 45 % (Bodegraven)	80.00	80.00	77.60	88.80	99.97	109.00	100.84	106.94	
	Cheese, Edam 40 % (Alkmaar)	71.00	68.38	65.74	77.93	88.40	93.24	90.99	95.56	
	Eggs (Roermond) (5)	4.95	6.25	6.55	8.57	6.52	8.77	7.22	8.12	
	Beef (Rotterdam) (6)	93	92	97	103	105	100	105	100	
	Pork (Rotterdam) (2)	43	44	47	54	77	74	79	77	
B I	Basic slag (3)	0.144	0.149	0.153	0.153	0.162	0.178	0.162	0.150	
	Superphosphate 17 %	2.55	2.00	2.65	2.79	3.24	3.89	3.15	3.04	
	Kainite (3)	0.154	0.154	0.154	0.152	0.153	0.152	0.150	0.148	
	Nitrate of soda	10.66	10.53	n. 10.40	n. 10.40	10.78	11.78	10.59	11.62	
	Sulphate of ammonia 20 1/2 %	9.35	9.25	9.45	n. 9.75	10.27	11.31	10.06	11.03	
B II	Maize	5.06	4.38	4.29	5.00	7.23	11.65	8.54	11.00	
	Linseed cake, Dutch	10.10	9.80	8.75	8.90	10.87	14.41	12.24	13.90	
	Coconut cake	8.00	7.60	7.45	7.40	9.29	12.53	10.05	12.47	
	Groundnut cake	7.50	6.95	6.75	7.08	9.94	13.87	10.95	13.58	
POLAND (Prices in zlotys per quintal).										
A I	Wheat (Warsaw)	27.22	23.46	24.95	27.65	36.87	46.78	40.99	48.45	
	Rye (Warsaw)	20.87	18.17	18.65	10.01	20.62	35.05	22.72	36.29	
	Barley (Warsaw)	23.75	24.68	25.50	25.29	25.40	85.20	26.88	38.03	
	Oats (Warsaw)	23.21	20.30	22.76	22.01	19.34	34.20	21.95	37.21	
A II	Butter (Warsaw)	588	546	485	526	608	705	590	692	
	Beef (Warsaw) (2)	90	96	104	113	181	142	131	147	
	Pork (Warsaw) (2)	129	134	127	167	233	215	238	255	
	Eggs (Warsaw) (7)	172	197	278	292	214	380	235	279	
B I	Superphosphate (3)	0.82	0.82	0.82	0.84	0.90	0.90	0.89	0.88	
	Potash salts 25 %	13.75	13.75	13.75	13.75	13.75	11.25	13.75	11.33	
	Sulphate of ammonia	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.50	
B II	Wheat bran (Warsaw)	n. 18.00	14.25	n. 14.33	13.83	14.75	27.68	16.64	25.56	
	Rye bran (Warsaw)	n. 10.50	11.87	11.75	10.98	11.07	25.00	13.34	25.55	
	Linseed cake (Warsaw)	n. 31.50	28.50	n. 31.50	29.60	35.71	49.40	39.56	50.02	
	Rapeseed cake (Warsaw)	n. 19.83	18.75	n. 20.90	20.33	27.42	39.70	29.85	40.23	

(1) Dozen. — (2) Live weight. — (3) Prices for unit per quintal. — (4) Hectolitre. — (5) 100 eggs. — (6) Dead weight. — (7) Box of 1440 eggs.

Groups	COUNTRIES AND PRODUCTS	Average							Agricultural year	
		III	II	I	X-XII	I-III	I-III			
		1931	1931	1931	1930	1930	1929	1929-30	1928-29	
SWEDEN (Prices in Swedish crowns per quintal)										
A I	Wheat	20.00	19.85	19.65	18.95	18.02	19.36	18.31	19.24	
	Rye	17.00	16.85	15.65	15.95	13.91	18.90	14.92	19.35	
	Barley	11.81	11.44	11.28	11.60	12.24	10.66	13.40	16.61	
	Oats	10.37	9.77	9.56	9.03	9.76	14.56	10.88	15.25	
A II	Beef (Göteborg) (1)	46	48	58	56	55	53	56	58	
	Pork (Göteborg) (1)	53	50	58	68	106	99	108	106	
	Butter (Malmö)	204	225	203	214	251	204	292	292	
	Eggs (Stockholm)	101	110	134	232	138	160	151	155	
B I	Superphosphate, 20 %	7.78	7.78	7.78	7.48	7.80	7.90	7.85	7.93	
	Potash salts, 20 %	7.95	7.95	7.95	7.87	8.10	8.40	8.25	8.65	
	Chilialtpeter	19.04	19.04	19.04	18.17	19.04	19.85	19.38	20.25	
	Calcium cyanamide	18.10	18.10	18.10	n. q.	18.10	18.90	18.40	19.70	
B II	Maize: La Plata	9.13	8.72	8.95	10.08	13.00	19.20	14.73	18.99	
	Wheat bran	10.39	10.14	9.51	8.65	9.92	14.88	11.12	14.82	
	Groundnut cake	13.68	13.23	13.20	13.18	17.12	22.89	18.42	22.80	
	Cottonseed cake	12.52	12.33	12.33	12.47	16.01	20.59	16.98	20.09	
	Soya meal	14.51	14.09	13.70	13.02	15.71	22.12	17.37	21.14	
CZECH(SLOVAKIA) (Prices in Czech. crowns per quintal).										
A I	Wheat	148	146	141	133	171	184	172	191	
	Rye	107	101	96	89	113	170	121	178	
	Barley	146	143	135	120	125	171	138	175	
	Oats	119	121	103	100	106	171	117	172	
A II	Edible potatoes	37	34	34	28	35	44	37	56	
	Hops	385	796	796	1,021	1,573	3,231	1,496	3,401	
	Butter	2,250	2,050	2,450	2,033	2,117	2,438	2,150	2,473	
	Fresh eggs (2)	1,003	1,104	1,440	1,350	1,136	1,750	1,125	1,305	
	Beef (3)	950	987	1,000	1,047	1,142	1,050	1,156	1,050	
	Veal (3)	970	1,000	987	1,058	1,233	975	1,219	1,012	
	Pork (1)	850	962	900	1,087	1,404	1,158	1,445	1,247	
	B I	Basic slag, 15 %	40.35	39.05	40.93	38.31
Superphosphate, 16 to 18 % . . . . .		...	...	...	...	57.80	60.35	58.37	59.07
Kalinite, 14 % . . . . .		...	...	...	...	23.90	23.90	23.62	23.40
Chile saltpeter . . . . .		...	...	...	...	170.50	180.20	169.46	178.36
B II	Sulphate of ammonia, 20 1/2 % . . . . .	...	...	...	...	149.00	167.33	149.04	163.29
	Maize	68	64	69	78	107	166	120	167	
	Wheat bran (Prague)	86	n. 81	75	69	76	129	86	130	
	Rye bran (Prague)	86	n. 80	75	62	68	129	83	130	
	Crushed soya (Prague)	129	n. q.	n. q.	128	142	192	164	190	
	Rapeseed cake (Prague)	95	n. 91	90	91	114	175	147	175	
	Linseed cake (Prague)	184	180	180	136	149	200	182	199	
	Groundnut cake (Prague)	117	112	112	117	145	202	174	202	

(1) Live weight. — (2) 1440 eggs. — (3) Dead weight.

THE PRICES OF AGRICULTURAL PRODUCTS DURING THE FIRST QUARTER OF 1931

In the following pages the index-numbers of prices of agricultural products and other price indices of interest to the farmer are given as published in the different countries. The indices collected together have been obtained according to different methods and criteria in the various countries. A detailed account of the items included in each series and the system of construction of the index-numbers may be found in the volume published especially for this purpose by the Institute, entitled « Index-numbers of prices of agricultural products and other price indices of interest to the farmer ». We refer the reader to this volume for an exact interpretation of the significance of the different series of data.

Owing to the substantial divergence which often exists in the value and significance of the indices available, much care is advisable in their utilization from an international point of view. For this reason it has been considered opportune to reproduce all the data in their original form only, without attempting to formally unite them. The latter process, by a comparison of often heterogeneous data, might easily lead to the drawing of erroneous relations and conclusions.

In any case, now that most of the index-numbers for March are available, a table is given below, corresponding to that published in the Bulletins for July, October and January and containing the quarterly indices.

General index-numbers of prices of agricultural products.

(Base: the first quarter of 1929 = 100)

COUNTRIES	1929				1930				1931
	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	1st Quarter
Germany	100 0	94 8	99 5	96 8	87 1	83.2	86 4	83 1	79 9
England and Wales	100 0	99 1	102 8	99 3	100 0	98 1	95 1	88 9	87.5
Estonia	100 0	92 4	93 3	89 4	80.0	71 1	69 3	64 9	64.0
Finland	100 0	96 3	90 7	87 9	82 2	77 6	76 6	69.2	69 2
Hungary	100 0	92 5	79 9	73 9	68 7	61 9	61.9	59 7	60.4
Italy	100 0	96 3	90.2	88 2	82 3	77 3	75 4	69 5	63.7
Netherlands	100 0	99 7	101 4	97 1	89 3	84 6	86 4	78.9	77.1
Poland	100 0	94 7	92 0	89 8	78 4	76 3	75 0	70.9	
Argentina	100 0	92 6	101 9	98.2	89 5	88 2	83 1	66 4	60.1
Canada	100 0	96 6	100 1	106 1	99.7	92.6	78.3	68.6	61.9
United States Bureau of Agricultural Economics	100 0	100 0	103 7	100 7	95 6	91 9	89 9	75 0	67.6
Unit Stat Bureau of Labor	100 0	97 5	100 9	96 4	92.8	87.3	79.5	74.5	67.3
New Zealand	100 0	97.0	95 4	87.1	80.5	77 4	75.8	64.1	57.4

The gravity of the fall in prices of agricultural products, which was already indicated by the indices for the last quarter of 1930, appears to be still greater according to the indices for the first quarter of 1931. The latter, in fact, are lower than those previously recorded in all countries except Hungary and Finland, and have fallen particularly in Italy, Argentina, Canada, the United States and New Zealand.

INDEX-NUMBERS OF PRICES OF AGRICULTURAL PRODUCTS AND OF COMMODITIES BOUGHT BY THE FARMER *

COUNTRIES AND CLASSIFICATION	March.	Febr.	Jan.	Dec.	Nov.	Oct.	March.	March.	Year	
	1931	1931	1931	1930	1930	1930	1930	1929	1930 (1)	1929
GERMANY (Statistisches Reichsamt) 1913 = 100.										
Foodstuffs of vegetable origin	121.0	114.1	111.6	111.3	110.9	108.8	109.0	133.0	115.3	126.8
Livestock	86.7	90.6	97.5	104.4	108.2	104.7	115.8	123.4	112.4	126.6
Livestock products	113.0	119.9	118.4	126.6	181.3	127.5	117.7	142.4	121.7	142.1
Feeding stuffs	102.7	93.0	90.9	91.1	87.9	87.2	85.8	142.2	93.2	122.9
Total agricultural products	106.7	105.9	103.7	110.4	112.0	109.3	110.0	133.7	113.1	130.2
Fertilizers	82.7	83.1	82.3	80.5	80.4	80.4	86.1	87.5	82.4	84.5
Agricultural dead stock	132.4	133.3	134.9	130.0	137.4	138.0	140.8	141.4	139.4	141.3
General index-number	113.0	114.0	115.2	117.3	120.1	120.2	126.4	136.6	124.6	137.2
ENGLAND AND WALES (Ministry of Agriculture) Average of corresponding months 1911-13 = 100.										
Agricultural products	123	126	130	126	129	129	139	143	134 *	144
Feeding stuffs	85	77	78	81	78	82	101	150	95	139
Fertilizers	100	100	102	101	100	99	102	101	101	100
General index-number (2).		100.6	100.8	102.2	104.2	106.4	121.2	141.8	113.1	135.3
ARGENTINA (Banco de la Nación argentina) 1926 = 100.										
Cereals and linseed	53.2	54.5	53.6	56.0	59.8	70.7	91.0	99.0	82.3	100.4
Meat	94.2	94.6	91.0	90.5	96.3	109.6	112.8	113.9	110.9	113.6
Hides and skins	70.1	70.0	69.1	66.6	70.4	72.3	75.3	106.7	71.6	95.0
Wool	61.5	55.2	50.6	51.8	57.3	62.2	71.9	113.1	67.4	108.5
Dairy products	74.3	72.9	69.7	68.7	72.6	78.5	91.9	105.6	82.4	105.9
Forest products	108.7	108.7	108.7	108.7	108.7	108.7	106.8	111.4	107.9	111.5
Total agricultural products	63.2	64.4	61.7	68.2	67.9	77.1	92.1	103.4	85.5	102.6
CANADA (Internal Trade Branch of the Dominion Bureau of Statistics) 1926 = 100.										
Field products (grain, etc.)	44.1	45.2	42.7	43.6	43.7	54.7	78.3	89.0	70.4	93.3
Animals and animal products	84.7	87.0	82.1	93.6	96.6	98.9	112.5	113.1	103.1	112.5
Total Canadian farm products	59.3	60.8	61.2	62.3	66.6	71.2	91.2	98.0	82.7	100.8
Fertilizers	86.5	89.4	88.9	89.2	89.3	89.2	83.7	96.3	88.6	92.6
General index-number	75.1	76.0	76.7	77.8	79.8	81.4	91.9	95.0	86.0	95.6
ESTONIA (Central Bureau of Statistics) 1922 = 100.										
Commodities imported	81	83	86	83	88	90	84	101.9	83	94.6
Commodities exported	68	66	64	63	72	72	102	113.1	88	112.9
Agricultural products imported and exported	72	72	71	70	74	75	94	109.1	84	105.7

* For an explanation of the method of calculation of the index-numbers, reference should be made to the Institute's publication "Index-numbers of Prices of Agricultural Products and other Price-indices of interest to the Farmer" (Rome, 1930).
(1) Most data for 1930 are provisional. — (2) Calculated by the "Statist", reduced to base-year 1913 = 100.

COUNTRIES AND CLASSIFICATION	March 1931	Febr. 1931	Jan. 1931	Dec. 1930	Nov. 1930	Oct. 1930	March 1930	March 1929	Year	
									1930 (1)	1929
UNITED STATES (Bureau of Agricultural Economics) Average 1909-10 to 1913-14 = 100.										
Cereals	74	75	77	80	80	82	107	124	100	121
Fruits and vegetables	109	109	108	106	114	127	160	112	158	136
Meat animals	106	108	112	112	118	125	151	160	134	158
Dairy products	101	101	107	117	124	125	126	144	123	140
Poultry and poultry products	92	79	110	127	146	129	115	144	126	169
Cotton and cottonseed	80	78	72	73	80	76	118	155	102	148
Total agricultural products	91	90	94	97	103	106	126	140	117	136
Commodities purchased by farmers (2)	136	139	149	149	149	149	153	156	151	165
Agricultural wages (2)	127	—	—	129	—	—	(3) 159	(3) 162	...	170
UNITED STATES (Bureau of Labor) 1926 = 100.										
Grains	59.3	60.4	62.4	64.0	64.0	72.1	83.5	98.2	78.6	97.4
Livestock and poultry	70.7	69.6	75.2	76.3	77.7	82.4	99.6	111.0	89.2	106.1
Other farm products	74.2	73.7	76.0	78.1	85.4	86.3	95.2	107.5	91.3	106.6
Total farm products	70.6	70.1	73.5	75.2	79.3	82.6	94.7	107.1	89.5	104.9
Agricultural implements	94.7	94.7	94.7	94.9	94.9	94.9	95.0	98.8	95.1	97.9
Fertilizer materials	80.8	81.1	81.4	81.4	82.1	83.6	88.2	94.7	85.4	92.1
Mixed fertilizers	88.3	89.1	90.4	90.6	91.1	92.9	94.8	96.7	93.6	97.2
Cattle feed	82.1	71.6	75.0	78.2	83.0	89.6	103.8	122.2	99.8	121.6
Non-agricultural commodities	75.7	77.1	78.2	79.4	80.9	82.8	89.8	94.9	85.9	94.4
General index-number	74.5	75.5	77.0	78.4	80.4	82.6	90.8	97.5	86.4	96.5
FINLAND (Central Bureau of Statistics) 1926 = 100.										
Cereals	74	74	75	72	71	68	81	107	76	98
Potatoes	73	68	68	59	51	51	101	194	76	148
Podder	70	62	59	58	58	57	63	71	62	69
Meat	73	73	74	72	70	77	101	112	88	108
Dairy products	74	75	73	74	79	83	84	101	84	108
Total agricultural products	75	74	74	73	74	75	88	108	88	100
General index-number	86	86	86	86	87	86	92	100	90	98
HUNGARY (Central Bureau of Statistics) 1913 = 100.										
Agricultural and livestock products	84	80	79	78	80	83	88	136	—	—
General index-number	94	92	91	90	92	94	100	136	—	—
ITALY (Consiglio Provinciale dell'Economia di Milano) 1913 = 100										
National agricultural products	345.90	348.75	347.90	356.83	373.77	390.97	430.07	546.30	413.89	506
General index-number	356.18	357.92	361.86	368.63	379.03	386.80	436.40	494.86	411.04	480
NEW ZEALAND (Census and Statistics Office) Average 1909-13 = 100.										
Dairy produce	104.3	102.9	98.8	102.6	104.8	110.2	129.0	141.9	120.0	1
Meat	125.4	142.4	147.0	160.0	146.5	143.7	172.8	181.1	161.6	1
Wool	60.3	55.7	62.3	59.3	79.8	86.2	98.8	175.6	95.7	1
Hides, skins, and tallow	78.4	96.0	93.2	122.6	98.9	112.1	173.2	186.1	142.1	1
Miscellaneous	114.0	122.9	113.8	126.8	126.0	114.7	141.5	158.8	129.0	1
Total agricultural products	95.1	97.2	96.7	101.8	107.4	114.3	132.1	168.4	124.8	1

(1) Most data for 1930 are provisional. — (2) 1910-14 = 100. — (3) January.

COUNTRIES AND CLASSIFICATION	March	Feb.	January	Dec.	Nov.	Oct.	March	March	Year	
	1931	1931	1931	1930	1930	1930	1930	1929	1930 (1)	1929
NORWAY (Kgl. Selskap for Norges Vel.) Average 1909-14 = 100.										
Cereals	104	104	102	99	101	109	128	174	(2) 155	(2) 182
Potatoes	181	181	180	158	155	172	120	138	(2) 120	(2) 231
Pork	81	84	80	98	102	98	127	151	(2) 141	(2) 157
Other meat	172	182	184	193	192	193	204	186	(2) 190	(2) 183
Eggs	124	101	107	146	179	151	90	146	(2) 135	(2) 150
Dairy products	135	138	139	150	158	158	148	158	(2) 161	(2) 176
Concentrated feeding stuffs	108	103	107	111	115	118	128	161	(2) 148	(2) 167
Maize	83	81	89	93	97	107	116	172	(2) 148	(2) 164
Fertilizers	96	96	96	95	101	106	106	101	(2) 108	(2) 104
NETHERLANDS (Directie van den Landbouw) Average 1924-25 to 1928-29 = 100.										
Products of the soil	71	66	62	59	61	68	55	80	(3) 68	(3) 87
Animal products	74	74	74	74	77	80	88	99	(3) 95	(3) 98
Total agricultural products	73	72	71	71	73	77	80	94	(3) 88	(3) 95
Agricultural wages	100	100	100	100	100	100	100	100	(3) 100	(3) 100
General index-number (4) . . . . .	...	...	71.0	72.4	74.4	75.1	83	90.5	79.2	96.1
POLAND (Central Bureau of Statistics) 1927 = 100.										
Products of the soil . . . . .	...	45.8	44.3	46.4	47.6	45.8	52.9	87.4	52.2	73.1
Products of agricultural industry . . . . .	...	59.3	59.3	63.6	65.4	63.1	70.7	87.3	69.9	80.9
Total products of plant origin . . . . .	...	52.6	51.5	54.6	56.1	54.0	61.3	87.4	60.6	76.9
Animals . . . . .	...	58.9	54.9	68.6	72.7	77.8	89.8	93.6	82.3	98.4
Dairy products . . . . .	...	80.1	83.1	91.9	97.0	88.2	78.9	103.4	81.3	102.9
Total products of animal origin . . . . .	...	67.7	66.2	78.2	84.0	82.4	84.9	97.9	81.9	100.2
Total agricultural products . . . . .	...	58.2	56.9	63.2	66.2	64.3	70.1	91.6	68.5	85.7
Fertilizers . . . . .	...	124.7	124.7	124.7	124.7	126.2	130.6	118.2	121.7	126.5
Industrial products . . . . .	...	84.4	84.1	86.9	88.9	90.6	97.5	104.7	94.2	103.3
General index-number . . . . .	...	72.4	71.6	76.2	78.6	78.4	85.0	99.0	82.4	95.7
YUGOSLAVIA (National Bank of the Kingdom of Yugoslavia) 1926 = 100.										
Products of the soil	73.3	73.5	71.7	72.5	71.4	77.3	95.9	137.6	89.3	118.6
Animal products	77.4	78.1	82.0	86.4	95.1	93.3	102.5	106.0	96.3	107.2
Industrial products	80.2	72.1	72.8	75.2	74.8	75.4	83.6	96.2	81.8	92.6
General index-number	74.8	74.8	75.7	78.0	79.2	80.9	91.1	106.6	86.6	100.6

(1) Most data for 1930 are provisional. — (2) Agricultural year April 1-March 31. — (3) Agricultural year July 1-June 30. — Calculated by the Central Statistical Bureau of the Netherlands, reduced to the base 1925-1929 = 100.

RATES OF FREIGHT

(Rates for full cargoes).

VOYAGES	April	April	April	March	March	Average				Commercial	
	17,	10,	3,	27,	20,	March	April	April		Season	
	1931	1931	1931	1931	1931	1931	1930	1929			
										1929-30	1928-29
SHIPMENTS OF WHEAT AND MAIZE											
Danube to Antwerp/Hamburg	(shill p. 13/0	13/6	13/6	13/6	13/6	13/9	14/3	n. q.	15/8	n. 14/0	
Black Sea to Antwerp/Hamburg	2240 lbs.) 10/6	10/4	10/4½	10/6	10/6	10/7	n. q.	n. q.	n. q.	n. q.	
St. John to Liverpool (1)	n. q.	n. q.	n. q.	1/6	1/6	1/6	1/6	1/6	1/6	1/6	3/1
Montreal to United Kingdom	(shill per 2/-	2/-	1/10½	n. q.	n. q.	n. q.	2/-	2/6	1/10	2/10	
Gulf to United Kingdom	480 lbs.) (1) 2/-	(1) 2/-	2/-	2/-	2/-	2/-	2/3	2/10	2/6	3/4	
New York to Liverpool (1)	n. q.	1/6	1/6	1/6	1/6	1/6	1/6	1/6	1/6	2/8	
Northern Range to U.K. and Continent	n. q.	1/8½	1/7½	1/7½	1/7½	1/10	1/9	n. q.	1/9	2/11	
North Pacific to United Kingdom (shill. per 2240 lbs.)	21/6	21/-	20/6	21/6	21/6	21/10	19/7	28/9	22/7	30/7	
Vancouver to Yokohama (1) (dollars p. sh. ton)	2 75	2 75	2 75	2 75	2 75	2 75	2 50	3 37	2 78	3 85	
La Plata Down River (2) to U. K./Continent											
La Plata Up River (3) to U. K./Continent	(shill. per 2240 lbs) 18/9	17/3	15/6	16/-	16/3	16/11	12/4	24/4	12/8	22/1	
Karachi to U. K./Continent (4)	20/-	19/-	17/-	17/6	18/-	18/7	14/6	25/10	14/4	23/7	
Western Australia to U.K./Continent	19/10	19/8	19/6	19/6	19/10	19/7	n. q.	19/1	n. 15/4	22/-	
	28/-	29/-	28/6	28/6	29/6	29/4	23/9	29/1	25/7	38/7	
SHIPMENTS OF RICE.											
										1930	1929
Saigon to Europe	(shill. per (1) 24/	(1) 25/	(1) 24/-	24/6	(1) 25/-	24/10	1) 16/1	1) 26/-	n. 18/11	n. 26/1	
Burma to U.K./Continent	2240 lbs) 23/3	n. 23/	23/-	23/9	27/6	24/1	17/4	25/3	n. 17/8	n. q.	

(1) Rates for parcels by liners. — (2) "Down River", includes the ports Buenos Aires and La Plata. — (3) "Up River", includes the ports on the Paraná River as far as San Lorenzo. Cargoes from ports beyond San Lorenzo (Colastine, Santa-Fé and Paraná) are subject to an extra rate of freight. — (4) The original data being quoted in "scale terms", 10 % is added to arrive at freight per 2,240 lbs.

IMPORT DUTIES ON CEREALS AND FLOUR

CHANGES AND CORRECTIONS

TO BE MADE IN THE DUTIES PUBLISHED ON PAGE 62 OF THE CROP REPORT OF JANUARY 1931.

COUNTRY	PRODUCT	Date when enforced	Original datum per metric quintal	Datum in Amer. cents per bushel or barrel
Belgium	Oats	March, 12	Belgian frs. 21.00	849
Belgium	Wheat and wheat flour	March, 19	(1)	(1)
Belgium	Wheat flour	March, 12	gold francs 39.00	669.02
Czechoslovakia	Barley	March, 12	Czech. crowns 69.00	44.45

(1) Import and transit only by special licence.

MONTHLY CROP REPORT AND AGRICULTURAL STATISTICS

The following notes refer to crop conditions quoted in the crop reports and in the tables. — Crop condition according to the system of the country: Germany, Austria, Hungary, Luxemburg and Czechoslovakia: 1 = excellent, 2 = good, 3 = average, 4 = bad, 5 = very bad; France: 100 = excellent, 70 = good, 60 = fairly good, 50 = average, 30 = bad; Lithuania, Poland, Sweden and Switzerland: 5 = excellent, 4 = good, 3 = average, 2 = bad, 1 = very bad; Netherlands: 90 = excellent, 70 = good, 60 = fairly good, 50 = below average; U. S. S. R.: 5 = good, 4 = above the average, 3 = average, 2 = below average, 1 = bad; United States: 100 = crop condition which promises a normal yield. — For other countries the system of the Institute is employed: 100 = crop condition which promises a yield equal to the average of the last ten years.

(For Latest Information see page 305).

CEREALS

The wheat market during April and the first half of May has undergone relatively slight price fluctuations determined principally by the news and forecasts relating a) to purchases on the part of importing countries up to the period of the new crop, purchases on which depends the greater or less magnitude of stocks of old crop remaining available in the exporting countries at the beginning of the new commercial year; b) to weather conditions, the progress of crops and their prospects in the principal countries.

* * *

As regards stocks to be carried over into the next season, that it is to say, the surplus with respect to world demand in the current season (1 August 1930-31 July 1931), some indication of their probable amount at the beginning of next August may be obtained from the following factors.

The surpluses that were available in the exporting countries on 1 August 1930 and those existing in these countries on 1 April 1931, taking account of exports from 1 August 1930 to 31 March 1931, may be estimated as follows:

Wheat.

	Exportable surpluses on 1st August 1930 (1)	Net Exports 1st August 1930 31st March 1931	Exportable surpluses on 1st April 1931
	(million centals).		
United States	245	45	200
Canada	245	111	134
Argentina	110	36	74
Australia	110	54	56
U. S. S. R.	60	54	6
Other countries	40	30	10
	810	330	480

(1) The bases of these estimates were indicated in the Monthly Crop Report for November 1930, February 1931 and April 1931.

	Exportable surpluses on 1st August 1930 (1)	Net Exports 1st August 1930 31st March 1931	Exportable surpluses on 1st April 1931
	(million bushels).		
United States	405	75	330
Canada	405	185	220
Argentina	185	60	125
Australia	185	90	95
U. S. S. R.	100	90	10
Other countries	70	50	20
	1,350	550	800

The quantities necessary to cover consumption in the importing countries were previously estimated by the Institute at 510 million centals (850 million bushels), of which 410 million centals (680 million bushels for Europe) and 100 million centals (170 million bushels) for non-European countries (1).

The imports of European countries during the first eight months of the current season compared with the preceding two years have been as follows.

Net imports of Wheat (including flour in terms of grain).

COUNTRIES	First 8 months of cereal year (August 1-March 31)			Total cereal year (August 1-July 31)		First 8 months of cereal year (August 1-March 31)			Total cereal year (August 1-July 31)	
	1930/31	1929/30	1928/29	1929/30	1928/29	1930/31	1929/30	1928/29	1929/30	1928/29
	million centals					million bushels				
Germany	11	22	24	20	47	10	36	41	48	78
Austria	5	6	6	11	8	8	11	9	10	14
Belgium	17	17	16	25	25	20	28	27	42	42
Denmark	4	3	6	5	10	7	5	10	8	16
Estonia, Finland, Latvia	3	4	4	5	7	5	6	7	9	11
France	18	11	18	(1) 7	32	30	19	30	(1) 11	53
Gr. Britain and Ireland	08	02	85	133	131	104	154	142	222	218
Greece	9	9	8	13	13	15	15	13	22	22
Italy	31	9	33	25	53	51	15	55	42	88
Netherlands	14	12	12	18	18	24	20	21	30	20
Portugal	0	1	(2) 3	4	(2) 4	1	2	(2) 5	7	(2) 7
Sweden and Norway	6	6	7	8	10	9	10	11	14	17
Switzerland	8	6	6	8	10	13	11	9	16	16
Czechoslovakia	8	5	7	8	10	13	9	12	13	17
TOTALS	232	203	235	200	378	388	341	302	503	628
Other countries: (Spain, Malta, Turkey, etc.)(2) . . . . .	...	4	11	7	17	...	7	18	11	20

(1) During the second half season exports exceeded imports. — (2) Figures partly estimated.

From the imports in the first eight months it does not seem very probable that Europe will fully attain the figure of imports forecasted and for this reason it must be reduced to 395 million centals (660 million bushels). With the easy absorption of wheat on the non-European markets, however, it is very probable that the requirements of non-European countries will exceed the quantity forecasted. Shipments to non-European countries in the period 1 August-31 March amounted to about 70 million centals (120 mil-

(1) The bases of these estimates were indicated in the Monthly Crop Report for November 1930, February 1931 and April 1931.

lion bushels) ; at the end of the season they may average about 115 million centals (190 million bushels). The total figure of world requirements for imports remains unchanged.

From the difference between supplies (810 million centals or 1.350 million bushels) and requirements (510 million centals or 850 million bushels), it results that on 1 August 1931 exportable stocks of grain will amount to about 300 million centals (500 million bushels). It may be recalled that the corresponding figures for 1 August were 251 million centals (419 million bushels) in 1930, 269 million centals (448 million bushels) in 1929, 152 million centals (254 million bushels) in 1928, 112 million centals (187 million bushels) in 1927 and 75 million centals (125 million bushels) in 1926.

*
* * *

As regards the prospects of the crop in the new season the information available concerning areas cultivated to wheat and crop condition at the beginning of May may be summarised as follows.

Areas cultivated. — For the areas sown to winter wheat, fairly complete data are possessed, covering about 90 % of the total area destined to this crop in the world, excluding the U. S. S. R. and China.

In Europe, the slight increase in the areas sown in Germany, Poland, Italy and Spain, have largely balanced the reductions made in France and Rumania. There will be, on the whole, a reduction of only about 300.000 acres compared with 1930. In India, there has been an increase of about 1.000.000 acres. In the United States, thanks to the very favourable course of the season which reduced winter damage to a minimum, it is anticipated that the area of winter wheat to be harvested will be about 1,800,000 acres larger than that of last year. In Algeria, a decrease of 400,000 acres is reported. In conclusion the data available would seem to indicate an increase of about 2,250,000 acres.

Areas cultivated to winter wheat

(thousand acres).

	1931	1930
Europe (1)	60,698	60,953
United States	40,432	38,608
India	31,609	30,468
Algeria and Tunisia	5,278	5,710
Total	138,017	135,739

With regard to spring crops, according to farmers' intentions to plant, a reduction of about 2,800,000 acres is anticipated in the United States and of 2,000,000 acres in Canada.

Important reductions are also forecasted in the two large exporting countries of the southern hemisphere : for Australia, this reduction has been estimated at about 4,700,000 acres ; for Argentina, on the basis of the recommendations made by the Government to farmers, a reduction of 10 % or about 2,000,000 acres may be counted upon, in comparison with 1930.

¶ Taking into account these different items, the probable areas to be harvested in 1931 may be roughly estimated as follows :

(1) Germany, Belgium, Bulgaria, Spain, Finland, France (including spring wheat), Italy (including spring wheat), Lithuania, Luxemburg, Poland, Rumania, Czechoslovakia, Yugoslavia ; these countries have about 4/5 of the total wheat area of Europe (excluding the U. S. S. R.).

Preliminary estimate of the total areas cultivated to wheat in the world
(excluding the U. S. S. R.)
(million acres).

	1931	1930
Europe	(1) 72.5	72.8
Canada	23.0	24.9
United States	58.1	59.2
India	31.6	30.5
Argentina	17.8	19.8
Australia	13.3	18.0
Other countries	(1) 18.6	19.0
Total	234.9	244.2

The figures would appear to indicate a reduction in the total area cultivated this year of about 10 million acres compared with last year. But they do not include the U. S. S. R. In the latter country, according to the five year plan, an increase of about 15 million acres was planned for this season. The information available indicates that there has been an increase in the winter wheat area of 2.5 to 4 million acres. With regard to spring sowings, weather conditions until a short time ago have been, however, unfavourable to preparatory work and the period remaining for completion of sowings is therefore very limited.

On the whole, therefore, it seems that there may still be a world reduction, but hardly an important one, in the area cultivated to wheat.

Crop condition at the beginning of May. — In Europe winter weather was generally very mild but in March and April temperatures remained well below the normal, greatly delaying growth in many countries and giving rise to frost damage, in some areas. According to information received by the Institute from different Governments, in most European countries crop condition of winter wheat at the beginning of May was less favourable than at the same date of last year; this is notably the case in Poland, Germany, Belgium, the Netherlands, Austria, Czechoslovakia and Hungary. In several of these countries however, an increase in warmth and rains towards the end of April and the beginning of May seems to have improved the situation.

In France, where the crop has suffered greatly from excessive rain, more favourable weather conditions during the latter half of March and part of April partially repaired the damage, and it appears that average yields may be counted upon.

In Italy prospects are fairly satisfactory.

The crop condition of winter cereals is generally good in Rumania and excellent in Bulgaria and Yugoslavia.

It also seems that in the U. S. S. R. the situation of winter crops is considered to be satisfactory.

Spring crops are generally backward in all European countries.

In the countries of French North Africa the growth of wheat, favoured by rains, has been vigorous in the regions where this crop is the most important. In Egypt yields are expected to be above the normal and slightly higher than those of last year.

(1) For certain countries of Europe and for most of the "Other countries", in the absence of later data, the figures of area cultivated in 1930 have been given.

In the United States, the condition of winter wheat at the beginning of May was the best recorded at this date in the last ten years and formed the basis of the forecast of a production of about 392 million centals (653 million bushels). The importance of this quantity as compared with the crops obtained in preceding years will be seen from the following table.

UNITED STATES. — *Winter wheat.*

Year of production	Area		% of area not harvested	Crop condition on May 1st	Yield per acre				Production			
	Sown	Harvested			Forecasted at May 1st		Actually obtained		Forecasted at May 1st		Actually obtained	
					thousand acres	centals	bushels	cental	bushels	thousand centals	bushels	thousand centals	bushels
1931 . .	41,998	(1) 40,432 (2)	3.7	90.3	9.7	16.1	...	...	391,741	652,902	...	...
1930 . .	42,513	38,608	9.2	76.7	8.1	13.6	9.4	15.7	315,042	525,070	362,602	604,337
1929 . .	42,720	40,059	6.2	83.6	8.8	14.7	8.6	14.4	357,201	595,335	345,728	576,213
1928 . .	47,317	36,213	23.5	74.9	8.1	13.6	9.6	16.0	291,687	486,483	347,204	578,673
1927 . .	43,373	37,723	13.0	85.6	9.2	15.3	8.8	14.7	356,364	593,940	331,648	552,747
1926 . .	30,887	36,987	7.3	84.0	8.9	14.8	10.2	17.0	329,345	548,908	376,460	627,433
1925 . .	30,848	31,234	21.6	77.0	8.1	13.6	7.7	12.9	366,000	444,833	241,040	401,734
1924 . .	38,016	35,056	8.4	84.8	8.9	15.0	10.0	16.6	330,008	553,013	355,355	592,259
1923 . .	46,001	39,508	14.3	80.1	8.7	14.5	8.7	14.5	346,972	578,287	343,066	571,777
1922 . .	47,930	42,358	11.6	83.5	9.2	15.3	8.3	13.8	350,876	584,793	352,127	586,878
1921 . .	45,625	43,414	4.8	88.8	9.8	16.3	8.3	13.8	377,572	620,287	360,190	600,816
1920 . .	44,861	40,016	10.8	79.1	8.5	14.2	9.2	15.3	290,783	484,647	366,358	610,597
1919 . .	51,483	50,494	1.9	100.5	11.0	18.4	9.0	15.1	539,949	899,915	456,226	780,377
1918 . .	43,126	37,130	13.9	86.4	9.4	15.7	9.1	15.2	343,523	572,539	339,059	565,090
1917 . .	38,350	27,257	28.9	73.2	7.9	13.2	9.1	15.1	219,670	366,116	247,741	412,901
1916 . .	39,245	34,709	11.6	82.4	9.1	15.1	8.3	13.8	299,568	490,280	288,832	480,553
1915 . .	42,431	41,308	2.6	92.9	10.4	17.3	9.8	16.3	415,754	692,924	404,368	678,947
1914 . .	37,156	30,048	3.1	85.9	10.7	17.8	11.4	19.0	378,000	630,000	410,894	684,960
1913 . .	33,274	31,099	4.7	91.9	10.0	16.6	9.9	16.5	308,143	513,571	314,137	523,561

(1) Area to be harvested. — (2) Percentage of area abandoned at May 1st.

The latest news confirms the fact that crops are growing well.

Much more moisture is needed in the spring wheat producing areas of the United States.

In Canada there is stated to be a serious deficiency of moisture reserves in large and important producing areas.

In India, wheat production is estimated at 208 million centals (347 million bushels) The following is a general review for a series of preceding years of the crops actually obtained and of the exports during the twelve months succeeding each harvest.

INDIA. — *Production and Exports of Wheat.*

Year	Production		Exports (1)	Production		Exports (2)	Year	Production		Exports (1)	Production		Exports (1)
	thousand centals		thousand bushels		thousand centals			thousand bushels					
1931 . . .	(2)	208,096	...	(2)	346,827	...	1920 . . .	226,733	7,136	377,888	11,893		
1930 . . .		231,907	895		388,512	1,492	1919 . . .	168,157 (5)	(1,708)	280,261 (3)	(2,847)		
1929 . . .		192,438 (5)	(6,006)		320,731 (5)	(10,000)	1918 . . .	222,253	10,429	370,421	17,381		
1928 . . .		174,518 (5)	(5,223)		290,864 (5)	(13,705)	1917 . . .	229,286	34,673	382,144	57,786		
1927 . . .		200,996	6,964		334,987	11,607	1916 . . .	193,805	18,669	323,006	31,447		
1926 . . .		194,790	4,793		324,651	7,989	1915 . . .	226,105	16,333	376,992	27,221		
1925 . . .		198,598	5,949		330,997	9,914	1914 . . .	187,421	17,320	312,368	28,366		
1924 . . .		216,364	27,186		360,640	45,226	1913 . . .	220,954	29,173	368,256	48,620		
1923 . . .		223,418	15,718		372,363	26,187	1912 . . .	222,909	39,090	370,555	65,149		
1922 . . .		220,192	5,916		360,987	9,859	1911 . . .	225,378	31,673	375,629	58,121		
1921 . . .		150,214 (3)	(6,170)		250,357 (3)	(10,288)							

(1) Net exports of wheat and flour in terms of wheat from April 1st of the year indicated to March 31st of the following year. — (2) First forecast. — (3) Net imports.

In conclusion, although the final results of production in the northern hemisphere still largely depend on the course of the season during the period still to elapse before harvest, at present it seems that an average yield may be anticipated for the whole of the countries of this hemisphere.

In Argentina and Australia weather conditions are favourable to work for the sowings.

* * *

Germany : The prevalently cold and wet April weather retarded the growth of cereals, which is now backward ; an improvement in temperature at the end of April, however, was beneficial to growth. The condition of winter cereals has changed little.

Spring work is still in arrear. No final judgment of winter damage can, on the whole, be given.

Crop condition of winter spelt at the beginning of May was 2.8 against 2.8 on April 1, 1931, and 2.4 on May 1, 1930.

Austria : During the whole of April weather was unsettled and prevalently cold. Precipitation was frequent but, in the valleys particularly, drought conditions existed and were aggravated by winds. Towards the end of April heavy rains were followed by a rise in temperature.

Growth of winter sowings was considerably checked by the cold and drought. Spring cereal sowing was greatly delayed. At the end of April sowings of wheat, rye, barley and oats had not been completely finished.

Belgium : Weather during April was relatively fine with some rain in the latter half of the month. These favourable conditions permitted field work to be continued. The predominance of east winds and night frosts was detrimental to growth of the plants ; and at the end of the month, growth was backward compared with that of a normal year. Winter cereals are, in general, thin and not very strong. Spring cereals were sown under good conditions.

The area sown to winter spelt this year is estimated at 56,000 acres against 36,000 in 1929-30 and 41,000 on the average of the previous five years ; percentages : 153.9 and 134.9. Crop condition and also that of mixed grain on May 1, 1931 was considered to be *average*, against *excellent* at the same date of last year.

Bulgaria : During April the weather was prevalently cold, causing some damage to winter cereals. Towards the end of the month and at the beginning of May, however, weather favoured the crops. Due to the prolonged winter, spring sowings have been delayed and were not commenced until the first week of May.

Estonia : Crop condition is better in higher lying areas than in the plains and valleys, where the spring floods have caused damage.

Irish Free State : The weather during the greater part of April was favourable and the sowing of crops was carried out under satisfactory conditions. No reports of injury as the result of storms or pests were received.

France : Spring wheat sowings, although estimated at 769,000 acres and greatly exceeding acreages sown in the last decade, have not compensated for the considerable reduction in sowings of winter wheat ; the latter, estimated at 11,725,000 acres, represents the smallest acreage sown in France excepting the four winters of the period 1916-1919.

Although there has been a considerable reduction in the case of rye, winter oats and barley sowings are the largest of the post-war period. Sowings of spring oats were reduced most while those of spring barley were the largest of the decade 1921-1930.

Area and Crop Condition.

COUNTRIES	AREA SOWN					CROP CONDITION (†)										
	1930-31		1929-30		Average 1924-25 to 1928-29	% 1930-31		I-V-1931			I-IV-1931			I-V-1930		
	Thousand acres					= 100	= 100									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	
WHEAT																
Germany	(1) 4,324	(2) 3,906	(3) 3,705	—	—	2.9	—	—	—	3.0	—	2.3	—	—	—	
*Austria	486	475	—	—	—	2.7	—	—	2.6	—	—	2.4	—	—	—	
Belgium	389	412	388	94.5	100.3	—	—	95	—	—	—	2.4	—	100	—	
Bulgaria	2,908	2,908	2,624	100.0	110.8	—	—	—	d)	—	—	d)	—	—	—	
Spain	10,872	10,531	10,743	103.2	101.2	—	—	—	—	—	—	—	—	—	—	
Finland	32	30	25	108.0	128.6	—	—	—	—	—	—	—	—	—	—	
France	12,494	12,900	13,128	96.2	95.2	—	—	—	—	—	—	—	—	—	—	
*Scotland	54	50	—	—	—	—	—	95	—	—	95	—	—	100	—	
Italy	12,020	11,896	12,156	101.1	99.0	—	—	—	—	—	—	—	—	—	—	
Lithuania	410	362	225	113.3	182.5	—	3.0	—	—	—	—	3.9	—	—	—	
Luxemburg	25	25	30	100.0	83.8	—	—	3.7	—	—	3.7	1.9	—	—	—	
*Netherlands	144	135	—	—	—	—	—	63	—	—	—	80	—	—	—	
Poland	3,844	3,714	3,009	103.5	124.1	3.3	—	—	3.1	—	—	3.8	—	—	—	
Rumania	6,154	6,873	7,054	89.5	87.2	—	—	—	120	—	—	—	—	—	—	
*Switzerland	128	117	—	—	—	—	—	92	—	—	94	—	100	—	—	
Czechoslovakia	1,904	1,919	1,709	99.2	107.6	2.9	—	—	2.9	—	—	2.4	—	—	—	
Yugoslavia	74	64	69	115.5	74.8	—	—	—	—	—	—	2.3	—	—	—	
Ukraine	5,239	5,233	4,545	100.1	115.3	d)	—	—	—	—	—	—	—	—	—	
Total Europe	60,698	60,953	59,590	99.6	101.9	—	—	—	—	—	—	—	—	—	—	
Canada (3)	820	815	825	100.6	90.3	—	—	97	—	—	—	—	—	87	—	
United States (3)	22,152	24,083	22,279	92.0	99.4	—	—	—	—	—	—	—	—	—	—	
Total America	40,432	38,908	36,467	104.7	110.9	90.3	—	—	—	—	—	—	—	76.7	—	
India	63,404	63,506	59,571	99.8	106.4	—	—	—	—	—	—	—	—	—	—	
*Japan	31,009	30,468	31,213	103.7	101.3	—	—	—	—	—	—	—	—	—	—	
Syria and Liban	1,108	1,175	1,147	99.4	101.8	—	—	f) g)	—	—	—	f)	—	—	—	
Total Asia	32,777	31,643	32,360	103.6	101.3	—	—	—	—	—	—	—	—	—	—	
Algeria	3,548	3,980	3,654	89.2	97.1	—	100	—	—	—	—	110	—	—	—	
*Egypt	1,577	1,554	—	—	—	104	—	—	100	—	—	103	—	—	—	
Tripolitania	17	12	—	140.0	—	—	—	—	—	—	—	—	—	—	—	
Tunis	1,730 (4)	1,730	1,719	100.0	100.6	120	—	—	120	—	—	—	—	—	—	
Total Africa	5,278	5,730	5,373	92.4	98.2	—	—	—	—	—	—	—	—	—	—	
Grand Totals	(m) 163,157	(n) 161,812	156,894	106.2	103.4	—	—	—	—	—	—	—	—	—	—	
	(n) 176,839	171,692	164,746	102.6	106.9	—	—	—	—	—	—	—	—	—	—	
RYE																
Germany	(1) 10,379	(2) 11,460	(3) 11,416	—	—	—	3.0	—	—	3.0	—	2.4	—	—	—	
*Austria	886	892	—	—	—	2.8	—	—	2.7	—	—	2.2	—	—	—	
Belgium	41	54	—	—	—	2.8	—	—	—	—	—	2.5	—	—	—	
Bulgaria	553	564	599	98.1	97.2	—	—	95	—	—	—	—	—	100	—	
*Spain	583	614	445	95.0	130.0	—	—	—	d)	—	—	d)	—	—	—	
Finland	1,544	1,446	—	106.7	—	—	—	—	—	—	—	—	—	—	—	
France	556	556	565	100.0	98.5	—	—	—	—	—	—	—	—	—	—	
Lithuania	1,745	1,906	1,970	91.5	88.0	—	—	—	—	—	—	—	—	—	—	
Luxemburg	1,136	974 (7)	1,102	116.6	—	—	—	2.9	—	—	—	4.0	—	—	—	
*Netherlands	22	22	17	100.0	130.0	2.9	—	—	—	—	3.3	2.0	—	—	—	
Poland	494	489	—	—	—	—	—	60	—	—	—	71	—	—	—	
Rumania	14,123	14,500	13,938	97.4	101.3	—	2.9	3.2	—	—	—	3.8	—	—	—	
*Switzerland	865	914	651	94.6	132.8	—	—	—	—	—	—	—	—	—	—	
Czechoslovakia	49	47	—	—	—	—	—	91	—	—	90	—	100	—	—	
Yugoslavia	2,493	2,611	2,535	95.5	98.4	—	—	3.3	—	—	3.1	2.4	—	—	—	
Ukraine	505	525	440	96.2	114.7	d)	—	—	—	—	—	—	—	—	—	
Total Europe	12,867	13,740	12,262	93.6	104.9	—	—	—	—	—	—	—	—	—	—	
Canada (3)	32,960	34,640	33,738	95.1	97.7	—	—	—	—	—	—	—	—	—	—	
United States (3)	45,827	48,396	46,000	94.7	99.6	—	—	—	—	—	—	—	—	—	—	
Total America	865	1,001	501	79.3	146.4	—	—	86	—	—	—	—	—	95	—	
Algeria	292	357	203	81.8	143.8	—	—	—	—	—	—	—	—	—	—	
Grand Total	3,793	3,722	3,601	101.0	105.8	—	—	85.4	—	—	—	—	—	84.0	—	
	(m) 4,950	(n) 5,170	4,396	95.7	112.7	—	—	—	—	—	—	—	—	—	—	
	2	5	3	41.9	60.6	—	100	—	—	—	—	—	—	100	—	
Grand Total	(m) 37,912	(n) 39,521	38,136	95.3	99.4	—	—	—	—	—	—	—	—	—	—	
	50,779	53,570	54,396	94.8	106.8	—	—	—	—	—	—	—	—	—	—	

COUNTRIES	AREA SOWN					CROP CONDITION (†)												
	1930-31	1929-30	Average 1924-25 to 1928-29	% 1930-31		I-V-1931			I-IV-1931			I-V-1930						
				1929-30 = 100	Aver. = 100	a)	b)	c)	a)	b)	c)	a)	b)	c)				
Thousand acres																		
BARLEY																		
Germany.	(1) 444	(2) 488	409	—	—	2.9	—	—	2.9	—	—	2.5	—	—				
Austria.	—	18	24	—	—	2.8	—	—	2.8	—	—	2.4	—	—				
Belgium.	—	411	346	—	—	2.3	—	—	—	—	—	2.3	—	—				
Bulgaria.	70	73	76	96.1	91.9	—	—	96	—	—	—	—	100	—				
Spain.	514	514	438	100.0	117.3	—	—	—	d)	—	—	d)	—	—				
France.	4,390	4,390	—	100.0	—	—	—	—	—	—	—	—	—	—				
Luxemburg.	1,965	1,799	1,739	108.6	112.4	—	—	—	—	—	—	—	—	—				
Netherlands.	9	7	8	110.1	101.9	2.6	—	—	—	—	—	3.1	2.1	—				
Poland.	—	77	71	—	—	—	66	—	—	—	—	72	—	—				
Rumania.	143	142	174	100.6	82.4	—	3.0	—	3.1	—	—	3.5	—	—				
Switzerland.	248	323	252	76.8	98.5	—	—	—	—	100	—	—	—	—				
Czechoslovakia.	—	16	16	—	—	—	—	98	—	—	—	94	—	100				
Yugoslavia.	1,759	1,079	1,706	104.8	99.6	2.7	—	—	—	—	—	2.3	—	—				
Canada.	611	637	556	95.9	109.8	d)	—	—	—	—	—	—	—	—				
Japan.	4,734	5,569	4,297	85.2	110.2	—	—	—	—	—	—	—	—	—				
Syria and Liban.	—	2,110	2,336	—	—	—	—	f) g)	—	—	—	g)	—	f)	—			
Algeria.	818	840	706	97.4	115.9	—	—	—	—	—	—	—	—	—				
Egypt.	3,185	3,650	3,445	87.3	92.4	—	100	—	—	—	—	110	—	—				
Tripolitania.	—	345	308	—	—	103	—	—	—	100	—	102	—	—				
Tunis.	371	247	—	150.0	—	—	—	—	—	—	—	—	—	—				
Tunis.	938	988	1,243	100.0	79.5	—	—	75	—	100	—	—	—	—				
OATS																		
Austria.	—	772	757	—	—	2.5	—	—	—	—	—	2.3	—	—				
Spain.	—	1,693	1,840	—	92.1	—	—	—	—	—	—	—	—	—				
France.	8,632	8,583	8,623	100.6	100.1	—	—	—	—	—	—	—	—	—				
Luxemburg.	70	70	72	100.0	97.6	2.5	—	—	—	3.0	—	2.3	—	—				
Switzerland.	—	48	50	—	—	—	—	66	—	—	—	—	100	—				
Czechoslovakia.	2,116	2,056	2,078	102.9	101.9	2.5	—	—	—	—	—	2.9	—	—				
Canada.	13,336	13,259	12,831	100.6	103.9	—	—	—	—	—	—	—	—	—				
Syria and Lebanon.	27	28	41	65.9	60.9	—	—	—	—	—	—	—	—	—				
Algeria.	554	638	605	86.7	91.5	—	100	—	—	—	—	—	100	—				
Tunis.	99	99	104	100.0	94.7	120	—	—	—	100	—	—	—	—				

* Countries not included in the totals. — a) above the average. — b) average. — c) below the average. — d) very good. — e) good. — f) average. — g) bad. — h) very bad. — m) not including Ukraina. — n) including Ukraina. — (†) See explanation according to the various systems, page 253. — w) Winter crops. — s) Spring crops. — (1) December estimate. — (2) May estimate. — (3) The area for 1931 is that which it is anticipated will be harvested: for previous years the figures refer to the area harvested. — (4) Provisional estimate made last year on the same date.

Spring sowings have permitted the reduction by 427,000 acres of the acreage deficit of 1,129,000 acres in sowings last winter compared with the winter of 1929-30. Compared with the average for the decade 1921-30, the total deficit, which was 1,092,000 acres of winter cereals, is now no more than 786,000 acres or 2.0 %.

Taking into consideration growing conditions, it is known that in the period March 15 to April 15 a considerable improvement took place in the condition of winter cereals owing to the exceptionally mild and wet winter. The latter half of April and the first few days of May, marked by rainy and abnormally cold weather, were particularly unfavourable in the Centre and East where the winter sowings are very thin and had begun to yellow at the beginning of May, and in the Southeast Rhône valley, where fairly sharp frosts have occurred; in the Southwest hail has caused some local damage, but the sowings, although thin, are apparently more promising than was anticipated last month. In these three weeks, growth of winter cereals was retarded everywhere but in the first few days of May their aspect was still good in the chief wheat areas, Beauce and the

Seine basin at Paris and in the North, despite a certain tendency to yellow on damper soils and fairly widespread growth of weeds.

If the weather returns to a seasonable normal of fine and sunny conditions, as it seemed would happen on about May 8th to 10th the general situation would be fairly satisfactory and average wheat yield could be hoped for; the conditions mentioned above do not justify the forecast of a yield of over 12 centals (21 bushels) per acre. Even if conditions turn out to be favourable from now until harvest time, it does not seem probable that production will exceed 154 million centals (257 million bushels).

In the absence of later adverse circumstances, however, there is reason to anticipate good crops of oats and barley as weather conditions were very favourable to the sprouting of the spring sowings of these cereals.

Great Britain and Northern Ireland : During the early part of April the weather over most of England and Wales was fair although temperatures were rather lower than usual for the time of year. There were occasional rains and cold winds continued to prevail. Good progress was made during this period in cultivation and sowing. The latter half of the month was almost everywhere cold and continuously wet with very little sunshine. Field work was considerably interrupted and in many parts of the country was somewhat behindhand at the end of the month. Autumn sown crops made some growth during the fair period but were checked by the return of cold and wet weather and were hardly as forward as usual. Germination of spring sown cereals was slow but the plant on the whole was satisfactory.

The weather during April in Scotland was generally cold, but dry; growth was more or less retarded but good progress was made with the seeding of crops and other farm work. The presence of wire worm is reported from a few districts. Crop condition on May 1, was slightly below average, expressed as 95 by the Institute's system compared with an average condition (100) on the same date of last year.

In Northern Ireland weather in April was rather unsettled; heavy showers of rain and hail were frequent and temperatures were somewhat low for the time of year. Ground frosts were experienced at night throughout the month.

Spring work was retarded particularly in late districts, where heavy clay soils remained unworkable. Sowings were, however, almost completed.

Wheat is looking well but crop condition is backward owing to late sowing and adverse weather. No appreciable change in wheat acreage is expected. Sowing of oats has generally been completed and some fine braids have already appeared in early districts. Where, however, weather and heavy soil conditions have combined to delay sowing this work is still much in arrears. The probable reduction in flax area this year is expected to lead to increased oats acreage.

Hungary : Between 3 and 24 April very low temperatures prevailed; at first the weather was dry but later exceptionally heavy precipitation occurred.

Winter wheat, rye and barley have been retarded by bad weather. Toward the end of the period under consideration growth was, however, vigorously resumed, and, owing to frost damage, some further cultivation was effected.

Toward the close of April the greater part of the spring sowings had been completed. Rains and warmth at the end of the period favoured their first growth.

Italy : In the first half of April weather was prevalently calm in the North and Centre, damp and rainy in the South, with light but frequent showers in the Islands. Temperature remained at a notably low level almost everywhere, some frosts being experienced. Despite the rather unfavourable weather, crop condition of wheat was fairly promising. Barley has commenced to ear. In some provinces slight damage has been suffered by early wheat owing to the frosts and hoar-frost.

In the second half of the month rainy weather predominated. Temperatures were

low and the consequent frosts caused loss. Late wheat, of which the condition remains good, is rather backward, while early varieties have begun to ear. Rust and other cryptogamic diseases are not widespread. Hail and late frosts have caused considerable losses. Minor cereals, particularly barley, are in good condition.

Latvia : The average temperature in April was very low. During the first ten days there were general frosts and the weather was cold until the beginning of the third week when the temperature rose. The quantity of atmospheric precipitation was a little above normal. Towards April 20, the snow had disappeared except in a few regions.

Lithuania : The slow melting of snow, lasting until April 20, has damaged crops in the plains, particularly rye. Spring cereal sowing had not begun.

Luxemburg : The generally low temperatures which predominated during the whole of April retarded the normal growth of the crops.

Poland : Temperatures during April were below the average, especially in the northern area of the country.

Throughout the country the degree of warmth was insufficient for growth of the plants.

Precipitation, except in some areas of the North of the country, was below the average; due to the relatively low temperature, however, soil moisture was adequate throughout the country.

Spring frosts, which continued until the middle of April, damaged winter crops and their condition of April 15 had deteriorated, particularly in southeastern areas; in fact the condition of winter wheat fell, from 3.1 on April 5 to 3.0 and that of rye from 3.2 to 2.9. On May 5 the crop condition of winter wheat had improved (3.3) while that of winter rye remained the same as on April 15.

Rumania : In the latter half of April the weather was favourable to crops. The rise in temperatures and timely precipitation permitted the continuation of agricultural work, and benefited growth, which was backward. In some regions of Bessarabia, Bukovina and in the Carpathian regions of Moldavia and Muntenia, alternate frosts and thaws in March damaged the winter sowings. In Transylvania, field rats destroyed the sowings in places.

The sowing of spring crops was recommenced as soon as the weather became settled and is proceeding under good conditions. Early sown barley and oats have sprouted well.

Switzerland : Owing to unfavourable weather crop condition of autumn cereals has undergone only slight change as compared with that of April. In a general way early sowings are more satisfactory than later. This is particularly the case as regards autumn wheat, the fields still having rather a bad appearance. The same applies to autumn rye, though it has shown some recovery recently. As regards spelt the fields here and there show the effects of the winter, especially where sowings were backward.

The commencement of spring sowings has had to be deferred in many cases until April owing to the prolonged winter. As a consequence these operations have had to be carried out rapidly. Germination of spring sowings was fairly regular but, as the soil was not sufficiently warmed up, vegetation is rather slow.

Crop condition of spelt on 1 May according to the system of the Institute was 92 against 94 on 1 April 1931 and 100 on 1 May 1930. That of meslin was respectively 95, 93, and 101.

Czechoslovakia : The area sown to mixed grain in 1931 is estimated at 25,500 acres against 19,300 in 1930 and 27,100, the average of 1925-1929; percentages: 132.5 and 94.3 respectively.

Yugoslavia : Prevailing weather in April was dry, cold and sunny. The cold was beneficial to winter cereals, checking their growth and thus preventing premature flowering. Crop condition of cereals towards the beginning of May was very good, especially of wheat, which promised abundant yields. Spring work proceeded rapidly due to the favourable weather.

U. S. S. R. : According to the Government plan, the total area sown to all cereals in the agricultural year 1930-31 is forecasted at 277 million acres, or about 10 % larger than that of the preceding year. The area sown to wheat and rye should be increased on the whole by 16.8 % compared with last year.

The areas of the different cereals to be harvested in 1931, compared with the areas harvested in the preceding two years, should be as follows :

	1931	1930	1929
	(million acres)		
Cereals (wheat and rye)	180.4	154.4	135.2
Fodder cereals (barley, oats and maize).	72.7	72.2	74.9
Other cereals (millet, buckwheat)	14.6	17.3	20.3

During the autumn there were sown to winter wheat and rye and, to a small extent, also winter barley, about 101 million acres so that in the spring there should be sown to the different cereals about 171 million acres. Owing to the weather conditions in March and the first half of April, which gave rise to a delay of the season of at least two weeks, the sowings have begun late ; on April 20 the area sown (including also crops other than cereals), reached only 9.1 million acres ; on April 25, 16.6 million and on May 1 33.6 million, namely : 13.7 % of the area for all spring crops as fixed in the programme.

In different regions of the U. S. S. R. on May 1, the percentages for the areas of spring sowings relative to the programme, were as follows : 12.2 % in the central area of the black earth region ; 14.5 % in the Middle Volga ; 22.1 % in the Lower Volga ; 34.3 % in the North Caucasus and 24.0 in the Ukraine.

The area sown to spring wheat on May 1 was 16,122,100 acres.

Due to the lateness of the season, which considerably shortens the period of time in which sowings can be effected, the progress of the latter is considered to be insufficient, especially on non-collectivised farms, which on May 1 had sown only 3.0 million acres. The number of collectivised farms on May 1 was 12,045,000 namely, 48.6 % of all the small and average agricultural holdings in the Union.

To give a greater impulse to sowings active propaganda is being made in the country with a tendency to introduce contract work on collectivised farms ; this should result in a greater intensity of work and greater discipline on the collectivised farms. On May 1 the proportion of collectivised farms on which contract work was introduced was 32 %.

Weather in the latter half of April favoured sowings.

Canada. (Telegram of May 12) : The season is well advanced throughout Canada but weather is generally too cool in the East and too dry in the west for the best germination and growth. Crops are well ahead in Ontario and the Prairies. Some large and important wheat districts have serious moisture deficiencies. The area sown to mixed grain is estimated at 1,211,000 acres compared with 1,201,000 last year and 1,009,000, the average for 1925-1929 ; percentages : 100.8 and 120.0.

United States : According to telegraphic information received from the U. S. Department of Agriculture, crop condition of winter wheat on about April 23, was good, whereas for spring wheat damper weather was desirable. In the last week of April frost retarded the growth of crops in the western winter wheat belt and hindered farm work, but there

was little or no injury to the winter wheat crop. The crop was jointing in southern Kansas. In the eastern part of the belt progress and condition varied from fair to excellent, the crop being well supplied with moisture; growth was too rank in some places. In the Pacific Northwest there was some injury by soil-blowing, and the winds depleted soil moisture rapidly; local reports of freezing were received but the crop was still, in satisfactory condition. Elsewhere winter wheat was doing well. In the same period in the spring wheat belt the soil was too dry in parts for germination, with further blowing; seeding was largely completed. Oats were generally up to good to excellent stands in central sections but in some more northern portions of the country there was slight frost injury; the crop in the South was growing well.

In the first half of May the growth of winter wheat was very good and on about May 13, the crop in Texas showed some signs of ripening. In the same period sowing of spring wheat was practically completed; weather in the spring wheat States was unfavourable with rains wanted and growth was poor.

A telegram of May 8th from the U. S. Department of Agriculture gives the revised areas sown to winter wheat and rye for the 1930-31 season as 41,993,000 and 4,091,000 acres respectively compared with the corresponding figures of 42,513,000 and 3,996,000 acres for 1929-30; the average winter wheat area for the five year period 1924-25 to 1928-29 is 42,650,000 acres and that of rye for the three years 1926-27 to 1928-29, 3,809,000 acres. Percentages: wheat: 98.8 and 98.5; rye: 102.4 and 107.4 respectively. In the case of rye the acreages estimated are those sown to grain, deduction having been made of average diversion acreage of to other uses.

According to the condition at May 1st, the production of winter wheat and rye is estimated at 391,741,000 centals (652,902,000 bushels) and 28,379,000 centals (50,676,000 bushels) respectively; corresponding figures for comparison are: 1929-30: wheat 362,602,000 (604,337,000); rye: 28,131,000 (50,234,000); average 1925-29: wheat 328,463,000 (547,427,000); rye: 25,832,000 (46,129,000); percentages: wheat 108.0 and 119.3; rye: 100.9 and 109.9.

Mexico: Wheat crops, particularly in areas of the North and Centre, have greatly suffered from the wet, cloudy weather in March. It is forecasted, however, that production this year will be about 25 % larger than that of last year due to the increase in area in the State of Coahuila in the northern zone and the State of Guanajuato in the centre zone.

Uruguay: The production of wheat in the season 1930-31 according to the latest official estimate, is 4,331,000 centals (7,218,000 bushels) against 7,894,000 (13,157,000) last year and 6,945,000 (11,574,000), the average for the preceding quinquennium; percentages: 54.9 and 62.4. This estimate, which the Government states is still subject to modification, shows a reduction of 467,000 centals (779,000 bushels) compared with that published in the bulletin of last March. Taking account of stocks residual from last season, estimated at 650,000 centals (1,084,000 bushels), of home consumption and of the quantities needed for seed, the Government considers that it will be necessary to import about 441,000 centals (735,000 bushels) of wheat.

Production of oats in the season 1930-31, according to the latest official estimate, is 1,101,000 centals (3,440,000 bushels, compared with 1,241,000 (3,877,000) last season and 824,000 (2,574,000), the average of the preceding quinquennium; percentages: 88.7 and 133.6 respectively. The estimate also cannot be considered to be final, as it is still subject to revision.

Production of barley in the season 1930-31 is estimated at 132,000 centals (276,000 bushels), against 129,000 (268,000) last year and 48,000 (100,000), the average for the preceding five years; percentages: 102.7 and 275.7.

India : According to a special report, the first estimate of wheat production in 1930-31 is 208,096,000 centals (346,827,000 bushels) against 220,976,000 (368,293,000) last year and the average of 192,685,000 (321,141,000); percentages: 94.2 and 108.0.

On about April 23 the general condition of the wheat crop in India on the whole, was reported to be good.

At the end of the month wheat harvesting was continuing in the Punjab; it was anticipated that yields would probably be generally below normal to normal.

Estimated area and production of wheat in the Punjab, according to a telegram of May 14, were as follows: area 1930-31: 10,572,000 acres compared with 11,263,000 in 1929-30 and 10,690,000, the average of 1924-25 to 1928-29; percentages: 93.9 and 98.9. Production: 78,938,000 centals (131,563,000 bushels); 92,781,000 (154,635,000) and 69,892,000 (116,487,000) respectively; (85.1 % and 112.9 %).

Algeria : Weather conditions in April were particularly favourable. After the spring rains, growth is now vigorous. On low lying land where the water had collected, however, the land has hardened and hindered the growth of the young plants. Grass is valueless due to its toughness of fibre. Moreover, towards the end of the month there was a beginning of complaints of drought in elevated areas in the East of the territory. Crop condition of cereals was, on the whole, considered to be *average* (100).

French Morocco : April was characterised by heavy storm rains alternating with periods of sunshine. These conditions were very favourable to cereals, the crop condition and growth of which are very satisfactory. Some slight local damage by hail is reported. Barley has headed under fairly good conditions in some districts and was nearly mature by the middle of May.

Tunisia : During April, average or fairly heavy rains fell over the whole of Northern Tunisia with very favourable effects on the growth of cereals. Dry weather persisted, on the contrary, in the Centre and South and was rather detrimental to crops.

The general judgment of all cereals on May 1, was *good* in the North and better than on April 1, whereas in the South and particularly in the Centre condition had deteriorated to *bad*. If the crop condition of each cereal over the whole territory is considered, differences are noted due to the varying size of acreages under separate cereals in the three regions mentioned above. Barley, which is principally grown in the Centre, suffered most from the drought.

Areas sown this year are stated to be about equal to those of last year. It is for this reason that this year's figures have been compared with the estimates made at the same period of last year. The first and very approximate estimates made in January 1930 have not been revised until recently. The revised figures of acreages sown to cereals for 1930 are: wheat: 1,928,000 acres; barley: 1,201,000 acres and oats: 124,000 acres. It is seen that these final data are much higher, by 10-20 %, than the preliminary approximate figures. It should be remarked that, for wheat, since the beginning of 1921 the final figures of area has always been higher by over 10 % than the provisional estimate made in May except in 1929 when there was only a slight modification. For the other cereals, the deviations have been of a similar nature. Moreover, the estimates of acreages sown to wheat in the four years 1928 to 1931, made in January and remaining in force until harvest have been identical, namely 1,730,000 acres whereas the final figures for the last three years have been respectively 2,020,000 acres in 1928, 1,732,000 acres in 1929 and 1,928,000 acres in 1930. It may therefore be observed that the preliminary figures furnish an indication of very little value.

Union of South Africa : Very general and soaking rains fell over wide areas at the beginning of April and conditions are ideal for the ploughing and planting of winter cereals, wheat, oats, barley and rye.

MAIZE

With the publication of the first official estimate of the Argentine crop the table of world production of maize is now practically complete.

According to this estimate the crop in Argentina this year constitutes a record. The highest figure so far attained was recorded in 1915 when 182.1 million centals (325.2 million bushels) were obtained; this year's crop is placed at no less than 207.9 million centals (371.2) This abundant crop is due particularly to the favourable seasonal conditions, area under cultivation differing very little from that of last year.

Area and production of maize in Argentina from 1924 to 1931.

Year of harvest	Area			Yield per acre		Total production	
	Sown	Destroyed	Harvested				
	acres	acres	acres	centals	bushels	centals	bushels
1931	13,776,327	2,037,414	11,738,913	17.70	31.61	207,789,084	371,054,018
1930	13,955,234	4,306,339	9,648,895	14.48	25.82	139,529,335	249,160,205
1929	11,831,579	3,137,568	8,694,011	14.92	26.65	129,754,888	231,705,787
1928	10,739,357	1,936,520	8,802,838	19.45	34.73	171,189,519	305,696,402
1927	10,568,505	1,537,883	9,030,622	19.85	35.41	179,677,345	320,853,275
1926	10,618,274	883,711	9,634,562	18.70	33.38	180,118,271	321,640,645
1925	9,162,060	1,966,071	7,195,989	14.50	25.89	104,328,272	186,300,994
1924	...	...	8,489,267	18.26	32.80	154,985,489	276,760,555

After the poor crop of last year Argentina was able to export up to 1 May of this year almost all its stocks of old crop. It may be estimated that the new crop will result in a surplus available for export of about 163 million centals (291 million bushels), the internal consumption of Argentina fluctuating around 44 million (79 million).

Argentine production and export of maize from 1924 to 1931

Year of harvest	Production	Exports during the 12 months following the harvest (1 May-30 April)							Exports expressed as % of the production	
		1st Quarter			May, June, July,	2nd Quarter (August, Sept., October)	3rd Quarter (Nov., Decem-ber, January)	4th Quarter (Febr., March, April)		Total season
		May	June	July						
(thousand centals).										
1931	207,790	...	...	...	...	...	...	...	...
1930	139,520	4,769	4,879	11,632	21,280	34,712	35,595	(1)16,887	(2)108,844	
1929	129,755	12,774	14,017	10,686	38,077	33,737	23,843	16,497	112,154	
1928	171,190	10,957	20,622	20,238	51,877	46,723	23,711	18,197	140,508	
1927	179,677	16,852	19,793	22,344	58,989	50,706	37,543	14,326	161,564	
1926	180,118	8,618	11,982	9,299	29,899	34,639	39,930	31,387	185,855	
1925	104,328	5,172	8,801	8,142	22,115	21,449	19,277	10,836	73,677	
1924	154,985	11,748	15,507	15,723	42,978	34,551	18,351	4,392	100,272	

(thousand bushels)

1931	371,054	...	...	...	...	...	...	...	...
1930	249,160	8,515	8,712	20,771	37,998	61,966	63,509	(1)80,156	(2)193,649
1929	231,706	22,810	26,101	19,082	67,993	60,246	42,577	29,459	200,275
1928	305,696	19,566	36,825	36,247	92,638	83,484	42,841	32,405	250,908
1927	320,853	30,003	35,345	39,900	105,338	90,548	67,041	25,582	288,509
1926	321,641	15,389	21,397	16,008	53,392	61,856	71,804	56,049	242,601
1925	186,301	9,236	15,716	14,539	39,491	38,302	34,424	19,350	131,567
1924	276,761	20,979	27,692	23,078	76,749	61,698	32,770	7,842	179,069

(1) February and March. — (2) Eleven months.

In the northern hemisphere preparations for sowing are proceeding actively. In several important maize producing countries sowings are reported to be considerably in arrears owing to the generally cold weather in March and April.

* * *

France : The bad weather which prevailed over the whole of France in the latter half of April retarded maize planting. While preparation of the soil has progressed well in the Southwest, it has been hindered in the East by bad weather and work was possible for only a short period in March.

Hungary : At the end of the third week of April, preparation of the soil for maize sowing was in progress. In some districts sowing had begun.

Italy : In the first half of April sowings continued and in the second half were terminated only in a few provinces.

Czechoslovakia : The area sown to maize in 1931 is estimated at 368,000 acres compared with 364,000 in 1930 and 344,000, the five year average of 1925-1929; percentages : 101.2 and 107.0.

Argentina : Maize harvesting during April proceeded under favourable conditions in all producing areas of the country. In general, the course of the season has been particularly favourable to maize crops so that in some commercial circles an exceptionally large crop of around 309,000,000 centals (551,000,000 bushels) is expected. Excessive heat in March and drought in April, however, were seriously injurious to late crops, while the appearance of diathrea caused rather considerable damage, especially in some departments of the province of Santa Fé.

In general, the losses incurred this year are less than those of last year and the larger part of the fields damaged was used for the pasturing of livestock.

Production is forecasted by the Ministry of Agriculture at 207,790,000 centals (371,054,000 bushels), constituting a record by exceeding even the heavy crop of 1915 which totalled 182,100,000 centals (325,200,000 bushels).

The higher yields per acre are found chiefly in the province of Santa Fé, the southern area of which has $\frac{4}{5}$ of the area sown in the province and possesses exceptionally favourable soils for this crop. The region of Buenos Ayres, which is essentially devoted to the production of maize, has also given excellent yields, exceeding those of the province of Santa Fé. In some parts of the province of Cordoba, quite extraordinary yields were obtained. To deal with a tendency in some agricultural areas not to harvest the product, due to low market prices, the Minister of Agriculture has made an appeal to the farmers and to the transport services to consider it their duty to harvest the crop, the high yield of which will partly compensate for the low market prices.

United States : On April 23 the Department of Agriculture telegraphed that maize sowings were progressing very well. In the last week of April low temperatures and general precipitation caused practically complete suspension of planting operations in the main maize belt and there are scattered reports of frost injury to the early crop. In the Southwest the cold was very detrimental and maize there was generally backward. Elsewhere in the South planting was advancing well, being nearly completed in some places, although growth was slow locally. In the first week of May planting progressed well ; in the second week the weather was unfavourable and growth of the crop was poor.

Mexico : During March maize planting continued under good conditions in the producing areas of the North and Centre. Preparation of the soil for "temporal" sowings was effected under good conditions and it is expected that, if weather conditions remain propitious, a larger area than of last year will be sown.

Maize.

COUNTRIES	(†) AREA					(†) PRODUCTION							
	1930	1929	Aver. 1924 to 1928	% 1930 1930/31	1930	1930	1929	Average 1924 to 1928	1930	1929	Average 1924 to 1928	% 1930 1930/31	1930
	—	—	—	—	—	—	—	—	—	—	—	—	—
	1930/31	1929/30	1924/25 to 1928/29	1929 — Aver.	1930 — Aver.	1930/31	1929/30	1924/25 to 1928/29	1930/31	1929/30	1924/25 to 1928/29	1929 — Aver.	1930 — Aver.
	1,000 acres					1,000 centals			1,000 bushels				
Austria . . .	139	138	148	100.9	04.3	2,474	2,580	2,390	4,417	4,617	4,267	95.7	108.5
Bulgaria . . .	1,696	1,977	1,577	85.8	107.5	19,075	20,723	13,342	34,062	37,005	23,824	92.0	143.0
Spain	1,072	1,000	1,088	106.6	08.5	15,303	13,884	13,257	27,327	24,794	23,073	110.2	115.4
France	832	852	849	97.8	08.0	12,333	11,002	9,358	22,023	19,046	16,711	112.1	131.8
Greece	337	344	502	97.9	67.1	2,094	3,342	3,502	4,810	5,967	6,253	80.6	79.9
Hungary . . .	2,664	2,774	2,599	96.0	102.5	29,303	39,554	39,037	52,328	70,332	71,316	74.1	73.4
Italy	3,737	3,719	3,776	100.5	98.9	60,081	55,789	54,445	118,001	99,024	97,224	118.4	121.4
Poland	233	218	216	106.8	108.0	1,847	2,101	1,935	3,299	3,752	3,455	87.9	95.6
Rumania . . .	10,980	11,840	10,026	92.3	109.1	87,043	140,792	89,232	155,435	251,414	159,343	61.8	97.5
Switzerland . .	3	3	3	100.1	96.5	87	80	84	156	159	150	97.5	103.4
Czechoslov. (1)	325	355	346	97.2	—	4,559	5,103	5,351	8,142	9,113	9,559	89.3	—
Yugoslavia . .	5,926	5,729	5,006	103.4	118.4	76,381	91,441	65,801	136,306	103,287	117,501	83.5	116.1
* U. S. S. R. (2)	9,625	8,785	(3) 8,303	109.6	115.9	...	92,815	(3) 70,018	...	105,741	(3) 142,711	...	...
Total Europe	27,903	28,944	26,136	96.4	106.8	317,180	386,406	298,634	566,395	690,010	533,273	82.1	106.2
Argentina . . .	11,738	0,040	8,677	121.6	135.3	207,790	139,529	153,014	371,054	249,160	273,239	148.9	135.8
Canada	102	152	203	105.9	79.4	3,263	2,902	4,466	5,826	5,183	7,079	112.4	73.0
United States	100,829	97,856	100,172	103.0	100.7	1,165,387	1,463,914	1,511,888	2,081,048	2,614,132	2,699,807	79.0	77.1
* Guatemala . .	245	347	330	70.5	74.3	...	2,883	2,351	...	5,059	4,198	...	...
Mexico	7,348	7,228	7,878	101.7	93.3	20,203	33,394	49,233	52,147	59,081	87,917	87.4	59.3
Total Amer.	120,077	114,885	116,930	104.5	102.7	1,405,643	1,639,739	1,718,601	2,510,075	2,928,106	3,068,939	85.7	81.8
Syria and Leb.	105	67	120	156.4	87.8	953	1,004	1,311	1,702	1,792	2,341	95.0	78.7
Algeria	21	23	25	80.4	84.0	116	151	141	207	270	251	76.6	82.5
Kenya	212	234	169	90.7	125.5	3,470	3,717	2,080	6,197	6,638	3,730	93.4	106.1
Fr. Morocco . .	664	600	539	110.7	123.2	2,807	3,055	3,324	5,173	5,455	5,936	94.8	87.1
Tunis	42	49	43	84.9	97.3	132	143	103	236	250	184	92.3	128.2
Un. of South Africa (4)	4,371	6,200	4,935	93.5	88.6	34,302	45,014	36,540	61,254	80,383	65,250	70.2	93.0
Total Africa	5,310	7,196	5,711	73.8	93.0	40,917	52,080	42,197	73,067	93,002	75,351	78.6	97.0
Grand Total	153,395	151,992	148,897	101.5	103.0	1,764,693	2,079,229	2,066,743	3,151,239	3,712,910	3,679,904	84.9	85.6

(†) The two dates mentioned refer to the years in which the harvest took place in the northern and southern hemispheres respectively. — * Countries not included in the totals. — (1) The figure for the averages is not exactly comparable with those of the years 1930 and 1929 owing to changes in the method of making estimates. — (2) For 1930: area sown; for the preceding years: area harvested. — (3) Average 1925 to 1928. — (4) Area harvested on European farms only; production comprises also that of the natives.

French West Africa: Large swarms of locusts in Mauritania, in French Guinea and in Senegal have considerably reduced the crop, which was below the normal.

Algeria: At the end of April 8,800 acres of maize had been planted while on June 1, of last year only 7,400 acres had been finished. The total area planted in 1930 was 20,900 acres and the average for 1924-28, 24,700 acres.

Weather conditions in April were favourable to field work, to sowings and to germination.

French Morocco: Maize and sorghum have benefited from the general rains and intermittent sunshine in April. Their condition is satisfactory.

RICE

Italy: Sowings, which were begun in the first half of April, were continued in the latter part of the month. In Piedmont they proceeded very slowly owing to the scarcity of water hindering flooding.

Mexico : In the State of Morelos and in the south of Puebla re-planting of rice during March was effected under good conditions. It is expected that the area planted will be smaller than that of last year.

India : Light rains fell over Bengal in the first part of April ; in the latter part of the month light, scattered showers fell in East and North Bengal and more was needed for the sowing of paddy, especially in the West. Apart from light rains at the beginning of April, weather during the month in Bihar and Orissa was dry.

French West Africa : Large swarms of locusts in Mauritania, in French Guinea and in Senegal have considerably reduced the crop, which was below the normal.

POTATOES

Germany : The transplanting of early potatoes has begun on favourably situated lands.

Belgium : Potato planting is practically finished.

France : Planting has been delayed by bad weather in the latter half of April; at the beginning of May, however, this work had been finished almost everywhere except in the East. In the Southeast and the Rhône valley, sharp frosts considerably damaged early plantings.

Great Britain and Northern Ireland : In Northern Ireland planting is well advanced.

Hungary : At the end of April planting of early potatoes had been finished and planting of late varieties was beginning.

Italy : In the first half of April sowings continued ; those of ordinary varieties were practically finished at the end of the month, while early varieties, of which in some provinces the digging has begun, presented quite a good appearance.

United States : On about April 23, planting of early potatoes had advanced to the more northern parts of the country.

SUGAR SEASON (*)

A month after the publication of the first estimate of probable area of sugar-beet cultivated this year the information that has reached the Institute does not add much to that already given in the last number of the Crop Report. Some changes have, however, been made and among these the most important are those for Germany, Rumania, Czechoslovakia and the U. S. S. R.

For Germany and Czechoslovakia data telegraphed by the Union of German Sugar Manufacturers have been substituted.

The area under beet in Rumania has been reduced by about one-third of that cultivated in 1930, since the Rumanian Ministry of Agriculture has warned growers not to devote more than 37,000 acres to the crop. The decision to diminish the output in this way was taken in agreement with the Syndicate of Rumanian Sugar Manufacturers to facilitate the disposal of the large stocks of sugar carried over from preceding years.

For the Soviet Union the figure for beet area is now estimated at 3,500,000 acres on the basis of information in the early part of May.

These modified data must also, however, be taken with reserve, everything depending on the sowings still to be effected, by far the greater part, since up to the first days of May only 5 % of the area aimed at had been sown.

(*) For Yugoslavia see page 280.

Acreege of Sugar Beet.

COUNTRIES	1931 (1)	1930	Average 1925 to 1929	% 1931	
				1930 = 100	Average = 100
				%	%
Acres					
Germany	872,120	1,157,194	1,062,520	75.0	82.0
Austria	101,000	89,000	61,846	114.0	164.0
Belgium	124,000	137,811	162,316	90.0	76.0
Bulgaria	37,000	48,789	34,622	76.0	107.0
Denmark	79,000	84,000	92,997	94.0	85.0
Spain	240,000	208,960	182,438	115.0	131.0
Irish Free State	8,200	14,389	14,211	57.0	57.0
Finland	4,900	3,090	5,296	160.0	93.0
France	620,000	679,480	583,647	91.0	106.0
Great Britain	284,000	348,364	165,415	82.0	172.0
Hungary	156,000	184,548	167,859	84.0	93.0
Italy	264,000	277,575	224,800	95.0	118.0
Latvia	7,000	5,900	—	125.0	—
Netherlands	92,000	142,196	157,114	65.0	59.0
Poland	408,000	457,000	510,179	80.0	80.0
Rumania	37,000	120,948	166,863	31.0	22.0
Sweden	82,800	96,520	77,983	86.0	106.0
Switzerland	3,600	3,040	3,657	104.0	86.0
Czechoslovakia	449,906	585,742	674,076	77.0	67.0
Yugoslavia	120,000	147,798	110,277	84.0	112.0
<i>Total Europe . . a)</i>	<i>3,990,535</i>	<i>4,791,844</i>	<i>4,458,125</i>	<i>83.0</i>	<i>90.0</i>
U. S. S. R.	3,460,000	2,533,000	1,626,373	137.0	213.0
<i>Total Europe . . b)</i>	<i>7,450,535</i>	<i>7,324,844</i>	<i>6,084,498</i>	<i>102.0</i>	<i>122.0</i>
Canada . . . . .	...	52,511	45,854	...	...
United States . . . . .	...	800,255	681,218	...	...

a) Not including the U.S.S.R. — b) Including the U.S.S.R. — (1) Approximate data.

These modifications do not change the general outlook as stated previously, namely an increase on the whole for Europe in this year's beet area as compared with that of last year.

* * *

Belgium : Sugar-beet sowing is being actively continued. A diminution in acreage to be sown to this crop is anticipated.

France : Sowings have been hindered by bad weather in the latter half of April. At the beginning of May they had, however, been partly effected in the principal sugar regions but weeds were spreading fairly widely.

Hungary : In the last week of April sugar-beet sowing was mostly in progress.

Italy : In April sowings were continued and practically completed, though owing to unfavourable weather conditions they have not developed satisfactorily everywhere.

U. S. S. R. : On May 1 the area sown was 185,100 acres or 5.3 % of that fixed in the plan. If the figure fixed in the plan is attained the area sown to sugar beet in the present year will be about 3,460,000 acres against 2,533,000 last year.

United States : Sugar-beet planting made good progress in the week ending April 23 in Colorado.

Sugar-cane was doing well on about April 23 in Louisiana.

Production of Beet Sugar (raw).

COUNTRIES	Total production during the season						% 1930-31	
	1930-31 (1)	1929-30	average 1924-25 to 1928-29	1930-31 (1)	1929-30	average 1924-25 to 1928-29	1929-30	average
	thousand centals			short tons			= 100	= 100
Germany	55,311	43,754	36,885	2,765,495	2,187,694	1,844,219	126.0	150.0
Austria	3,312	2,654	1,980	165,588	132,605	90,307	125.0	167.0
Belgium	6,188	5,469	6,500	306,884	273,426	329,791	112.0	93.0
Bulgaria	1,204	816	617	60,205	40,800	30,836	148.0	195.0
Denmark	3,682	2,954	3,337	184,000	147,708	166,840	125.0	110.0
Spain	6,869	4,880	4,955	318,499	244,018	247,731	130.0	128.0
Irish Free State	468	510	411	23,390	25,485	20,563	82.0	114.0
Finland	82	56	85	4,079	2,790	3,237	146.0	135.0
France	26,211	20,217	17,065	1,310,512	1,010,848	898,238	130.0	146.0
Great Britain	10,231	7,088	2,923	511,556	354,178	146,158	144.0	350.0
Hungary	5,154	5,442	4,189	257,708	272,083	209,472	95.0	123.0
Italy	9,415	9,923	6,927	470,745	496,135	346,353	95.0	136.0
Latvia	265	187 (2)	44	13,228	9,348 (2)	2,205	141.0	600.0
Netherlands	6,393	5,723	6,477	320,000	286,170	323,827	112.0	99.0
Poland	16,755	20,192	13,029	838,000	1,009,597	651,433	83.0	129.0
Rumania	3,620	1,813	2,778	181,009	90,642	138,875	200.0	130.0
Sweden	3,748	2,678	2,040	187,801	133,884	146,984	140.0	127.0
Switzerland	128	135	151	6,300	6,760	7,572	93.0	83.0
Czechoslovakia	24,937	22,822	27,747	1,246,831	1,141,075	1,387,334	109.0	90.0
Turkey	214	121 (2)	76	10,700	6,046 (2)	3,780	177.0	283.0
Yugoslavia	2,303	2,955	2,007	115,150	147,729	100,369	78.0	115.0
<i>Total, Europe . . . a)</i>	<i>185,938</i>	<i>160,384</i>	<i>142,105</i>	<i>9,297,280</i>	<i>8,019,101</i>	<i>7,105,124</i>	<i>116.0</i>	<i>131.0</i>
U. S. S. R.	39,022	18,387	22,064	1,951,000	919,318	1,103,202	212.0	177.0
<i>Total, Europe . . . b)</i>	<i>224,960</i>	<i>178,771</i>	<i>164,169</i>	<i>11,248,280</i>	<i>8,938,419</i>	<i>8,208,326</i>	<i>126.0</i>	<i>137.0</i>
Canada	948	789	806	47,399	39,431	40,295	120.0	118.0
United States	25,430	21,898	21,738	1,274,000	1,094,610	1,096,900	116.0	117.0
<i>Total, North America</i>	<i>26,428</i>	<i>22,682</i>	<i>22,544</i>	<i>1,321,399</i>	<i>1,134,041</i>	<i>1,137,195</i>	<i>117.0</i>	<i>117.0</i>
Korea	22	16	11	1,007	813	564	136.0	196.0
Japan	647	631	392	32,334	31,544	19,615	102.0	163.0
<i>Total, Asia . .</i>	<i>669</i>	<i>647</i>	<i>403</i>	<i>33,341</i>	<i>32,357</i>	<i>20,179</i>	<i>103.0</i>	<i>166.0</i>
Australia	75	78	40	3,752	3,889	2,450	96.0	153.0
General totals . . . { a)	212,110	183,791	163,161	10,635,772	9,189,388	8,254,957	116.0	129.0
 { b)	232,132	205,178	187,165	12,606,772	10,106,706	9,358,159	125.0	135.0

a) Not including U.S.S.R. — b) Including U.S.S.R. — (1) Approximate data. — (2) Average 1926-27 to 1928-29.

Mexico : During March cutting of sugar cane extended in all the principal producing States of the Republic, with good results, especially in the regions of Sinaloa and Jalisco.

India : April weather was dry ; crops at the beginning of May were doing well and prospects were generally favourable. In the Punjab light showers fell in some districts during April but otherwise the weather was mostly dry ; at the beginning of May crops were in average to good condition. Light scattered rains fell in Bihar and Orissa in the first half of April but the latter part of the month was dry ; at the beginning of May crops were in good condition.

Réunion : In January, the production of sugar cane for 1930-31 was estimated at 10,833,000 centals (542,000 sh. tons), showing a decrease of 1.6 % from that of 1929-30 (11,015,000 centals or 551,000 sh. tons) and of 12.8 % from the quinquennium 1923-24 to 1927-28 (12,428,000 centals or 621,000 sh. tons).

The subsequent cyclone which burst over the island will have destroyed a very large proportion of the crop, estimated at as much as 40 %. Sugar production would also be reduced to 660-770,000 centals (33,000-38,500 sh. tons) of raw sugar.

Production of Cane Sugar.

COUNTRY	1930-31 (1)	1929-30	Average 1924-25 to 1928-29	1930-31 (1)	1929-30	Average 1924-25 to 1928-29	Percentages for 1930-31	
	Thousand centals			Short tons			1929-30 = 100	Average = 100
							%	
AMERICA.								
Argentina	8,416	7,506	8,406	420,780	375,310	420,300	112.0	100.0
Brazil	11,464	13,217	16,786	578,196	660,829	839,310	87.0	68.0
Cuba	69,933	104,630	106,750	3,496,640	5,231,437	5,337,420	67.0	66.0
Ecuador	410	420	431	20,500	21,008	21,560	98.0	95.0
United States (Louisiana)	4,157	3,992	1,911	207,850	199,609	95,575	104.0	217.0
Jamaica	1,889	1,449	1,242	69,000	72,460	62,103	96.0	112.0
Mexico	5,401	4,713	4,111	270,000	235,700	205,530	115.0	131.0
Peru	9,259	9,308	7,518	460,000	465,406	375,910	99.0	123.0
Porto Rico	15,339	17,307	12,897	766,938	865,352	644,827	89.0	119.0
Dominican Republic	8,351	8,073	7,580	417,570	403,638	379,000	103.0	110.0
Total, America	134,119	170,615	167,632	6,702,474	8,530,743	8,381,535	79.0	80.0
ASIA.								
Formosa	17,506	17,868	12,160	875,283	898,396	608,450	98.0	144.0
India	71,187	61,846	65,901	3,569,400	3,092,300	3,295,000	115.0	97.0
Japan	2,641	2,318	2,108	132,100	115,909	109,020	114.0	120.0
Java	65,455	64,838	51,086	3,272,681	3,241,864	2,554,268	101.0	128.0
Philippine Is.	17,417	17,858	15,587	870,000	890,000	779,000	98.0	112.0
Total, Asia	174,206	164,728	146,941	8,709,444	8,233,469	7,346,638	106.0	113.0
AFRICA.								
Egypt	2,885	2,368	1,074	134,200	118,402	98,716	113.0	136.0
Mauritius	4,841	5,248	4,982	242,065	262,396	249,100	92.0	97.0
Reunion	1,111	1,125	1,114	55,567	56,240	55,703	99.0	100.0
Union of S. Africa	7,860	5,973	4,748	393,000	298,635	237,390	132.0	165.0
Total, Africa	16,497	14,714	12,818	824,892	735,663	640,909	112.0	129.0
OCEANIA.								
Australia	11,813	11,883	10,843	501,000	504,000	542,000	99.0	100.0
Hawaii	19,160	18,320	16,746	958,000	916,000	837,300	105.0	114.0
Fiji Is.	1,984	1,971	1,895	99,200	98,500	94,730	101.0	105.0
Total, Oceania	32,957	32,174	29,484	1,648,200	1,608,500	1,474,030	102.0	112.0
General Totals	357,779	382,331	356,875	17,885,019	19,198,389	17,843,112	94.0	100.0

(1) Approximate data.

(1) Approximate data.

Italian Somalia : The lack of adequate moisture has checked the growth of the crop. Locusts have caused some damage.

The latest estimate of the cane area is 1,544 acres against 1,594 in 1929-30 and 1,011, the average for the period 1925-26 to 1928-29, percentages : 96.9 and 152.8.

Production of cane amounts to 965,000 centals (48,200 short tons) compared with 683,000 (34,100) in 1929-30 and 481,000 (24,100), the average for the period 1925-26 to 1928-29 ; percentage increases : 41.3 and 100.3.

Australia. (Telegram of May 7) : Rains have improved the prospects for sugar production but it is anticipated that yields will be lower than last year. Grubs have caused damage in some areas.

VINES

Information now available allows a general view of the viticultural and wine situation to be given.

In the first place the crop in the southern hemisphere is without doubt good on the whole : in Australia excellent yields are anticipated, as also in Brazil ; Argentine production will probably approach the record of last year.

In the northern hemisphere the position at the middle of April was fairly good on the whole, despite the fact that the rainy weather had hindered operations. In North

Africa crop condition was good ; in Spain appearances were very good ; in France growth had been vigorous and the formation of grapes nearly average ; in Danubian and Central Europe also growth had been good. On the other hand in Italy, particularly in the North and Centre, the cold wet spring has been unfavourable ; growth is backward as well as work in the vineyards and the formation of grapes poor. The crop in Greece has been severely affected by the frosts in March, especially in the Peloponnesus.

In the last days of April frosts have somewhat changed the situation. It is true that only in Spain have the vines been seriously attacked : in almost all the provinces, Levante excepted, the frosts attacked the vines just when the formation of the grapes was taking place and the loss is probably on the whole between 15 % and 25 %. In France losses are only local. Italy, the Danube countries and North Africa, as well as the countries of Central Europe have so far been free, but in the latter countries the danger is not yet past.

On the whole, the viticultural situation in the northern hemisphere at the beginning of May was less satisfactory than last year at the same date.

The wet winter and spring have given cause for anxiety as to cryptogamic diseases, but in a general way preventive measures have been taken under good conditions. Some losses from insects have been reported in various countries.

On the wine markets the crisis persists. French markets are still calm ; consumption has been maintained at nearly the same level as last year but has been met to a greater extent by foreign supplies. In Italy and Spain the crisis is marked by a slackening in internal trade, though shipments abroad have shown development. In the other producing countries there has been continued falling off in exports, in association with restricted consumption in the principal importing countries.

In March-April movement of the poorer quality wines has brought a fall in prices, especially for low degree wines, while higher class wines remain quite firm. Towards the end of April and the beginning of May in France prices, for various reasons, advanced slightly, and it appears that inferior quality wines have in great part been disposed of and will no longer depress the market. In all the circumstances firmness of prices appears to be the dominant feature on the principal wine markets at least until the approach of the vintage.

Austria : At the end of April the shoots had just begun to bud. Numerous new plantations were reported. At the beginning of May crop condition of the vines was 2.3 against 2.4 on April 1 of this year and 2.1 on May 1, 1930.

France : Sharp frosts towards the end of April severely damaged vines in the Rhône valley and Provence, but the four large producing departments have been almost entirely spared as have also the other vine growing areas. In the South there is now no longer any fear of frost ; losses may be estimated at a maximum of a million hectolitres. Moreover the general condition of vines is good, except in the Bordeaux area, which suffered from bad weather in the latter half of April. Growth is in general very vigorous ; bud formation is, on the contrary, inferior to the normal, especially in the West. Until now, no attacks of cryptogamic disease have been reported ; the first treatments have been applied under excellent conditions.

Hungary : Vines passed the winter in excellent conditions. Cold and rainy weather in the first three weeks of April, however, greatly retarded the operations necessary to vine growing. On the wine market brisk offers met with little interest.

Italy : Vegetation, already good during the first half of April, made further progress in the latter half of the month, especially in the more southerly parts of the country.

Growth is vigorous and promising. Slight damage to the buds from frosts is reported everywhere.

Luxemburg : The area of vines in 1931 is 3,100 acres, the same as last year ; crop condition on May 1, according to the system of the country was 3.2 against 2.4 at the same date last year.

Turkey : It is reported that vine growing has made progress in the Istanbul district, especially in Mal Tepe, Eyub and Chataldja.

Algeria : Since the beginning of March, weather conditions have favoured vines. It has consequently been possible to hasten work and the arrears at the end of the winter were made up for by the middle of April : the soil is now well prepared. New plantings were effected rapidly. Some local damage by insects, is reported in the department of Algiers. The condition of vines was on the whole considered to be good (100) as on May 1 of the years 1930, 1929 and 1928.

According to a recent estimate, the total vine area is 697,000 acres, of which 608,000 in production ; the increase is therefore small for the area of vines bearing (1.1 %), but relatively large for the total vine area ; this fact would appear to indicate a fairly large extension of new plantings. There is every reason to believe, however, that in calculating these figures no account has been taken of acreage of old vines uprooted or of replacements and new plantings accomplished during the winter and spring of this year ; they therefore represent the vine area of last autumn.

French Morocco : Hailstorms have caused some fairly serious damage locally to vines, otherwise April has been very favourable to the growth of vines, which seem to be in satisfactory condition. Bud formation has been normal. Anti-cryptogamic treatment has proceeded actively.

Tunisia : Rainfall in April in North Tunis favoured the vines. In the Centre and South reserves of soil moisture are poor and the drought persists. For the whole territory, however, crop condition of vines on May 1, was considered to be good (100) as on May 1 of previous years.

According to a recent estimate the total vine area of Tunisia for the viticultural year 1930, is 98,000 acres, of which 87,000 bearing ; these acreages therefore show increases of 13.1 % and 14.5 % respectively over those of 1929 (total acreage : 87,000 ; bearing : 76,000) and of 33.5 % and 27.6 % over the average for the quinquennium 1924-28 (total acreage : 74,000 ; bearing : 68,000).

OLIVES

Italy : The final figure of production of olive oil in 1930-31 is 2,711,000 centals (35,618,000 American gallons) against 6,383,000 (83,871,000) in 1929-30 and 3,976,000 (52,244,000), the average of the preceding quinquennium ; percentages : 42.5 and 68.2. Growth is good.

Algeria : Since the beginning of March weather conditions have favoured olives. Flowering has taken place under good conditions. The condition of olives was considered to be good (100) as on May 1 of last year ; a considerable improvement has therefore taken place since last December, January and February when condition was respectively 50, 60 and 75.

According to a recent and very approximate estimate, the olive area should be 211,000 acres, of which 191,000 bearing. This estimate probably refers to the acreage at the time of the last harvest and does not take into account the plantations of this spring.

Tunisia : Rainfall in April in North Tunisia was very beneficial to olives. In the Centre and South, on the contrary, the drought was not broken and reserves of soil moisture are hardly sufficient for the needs of the olive trees in the coming summer. Flowering took place under good conditions and, thanks to the fine weather, condition of olive trees on May 1, was good (100) as on May 1, 1930.

COTTON *

Italy : In the second half of April sowings were completed in Caltanissetta, which produces almost all the output of Italy.

U. S. S. R. : On 1 May the area sown to cotton was 535,700 acres, *i. e.*, 9.6 % of that aimed at under the Plan. If the latter figure is attained the area cultivated to cotton will be 5,560,000 acres against 3,768,000 acres in the preceding season.

United States : According to a telegram received from the Department of Agriculture crop condition of cotton improved during the week ending April 23. In the following week, coolness retarded the growth of early planted cotton in western cotton belt States while in the eastern sections somewhat more favourable conditions prevailed, planting having made rather satisfactory advance, although germination was slow. In Texas the crop was backward, some frost damage occurred and condition was only fair. In Oklahoma planting was mostly suspended and is unusually late. In the central parts of the belt progress in planting, germination and growth varied widely. Crop condition in Georgia was fairly good.

In the first half of May, cool wet weather continued to be unfavourable to the growth and germination of cotton.

Mexico : During March cotton planting continued under good conditions in the principal producing areas of the North ; with the exception of the Tamandipas region where planting was effected under rather unfavourable conditions resulting in a large reduction in acreage sown compared with last year. In some northern Pacific coastal regions, the preparation of the soil for the coming sowings continued. In the State of Nayarit crops are showing the effects of lack of rain.

St. Vincent : Attacks of disease and insects during the first quarter of the present year were slight. It is forecasted that the percentage of cotton damaged will not be very high and that yields per acre will be good.

India : The estimates for cotton of the supplementary final report are as follows : Area 1930-31 ; 1929-30 ; average 1925-25 to 1928-29 : 23,616,000 · 25,922,000 and 26,368,000 acres respectively ; percentages : 91.1 and 89.6. Production of ginned cotton : 19,280,000 centals (4,033,000 bales) ; 20,500,000 (4,289,000) and 23,256,000 (4,865,000) respectively ; percentages : 94.0 and 82.9.

French Equatorial Africa : The production of raw cotton for the season 1930-31 is estimated at 132,000 centals (28,000 bales) compared with 62,000 (13,000) in 1929-30, 16,000 (3,300) in 1928-29 and 13,000 (2,800) in 1927-28. Percentages : 214.3 % of 1919-1930 and 456.3 % of the average of the two preceding seasons.

French West Africa : The preliminary estimate of ginned cotton production in Dahomey in 1930-31 is 26,300 centals (5,500 bales) against 25,900 (5,400) in 1929-30 and the average of 20,400 (4,300) for the period 1923-24 to 1927-28 ; percentages : 101.4 and 128.7.

The crop was also good in Senegal and a considerable extension in the cultivation of cotton is reported in Mauritania.

* For Yugoslavia see page 280.

Egypt (Telegram of 16 May) : The amount of cotton ginned from the beginning of the season, 1 September 1930 to 30 April 1931, was as follows, in comparison with the corresponding amount on 31 March 1931 :

Variety		30/IV/31	31/III/31
Sakellaridis	(1000 centals)	1,595	1,558
	(1000 bales)	334	326
Other varieties	(1000 centals)	4,849	4,619
	(1000 bales)	1,014	966
Total lint	(1000 centals)	6,444	6,177
	(1000 bales)	1,348	1,292
Linters	(1000 centals)	151	149
	(1000 bales)	32	31
Total lint and linters	(1000 centals)	6,595	6,326
	(1000 bales)	1,380	1,323

Italian Somalia : Complaints are made of losses due to the drought. Locusts have damaged plantations in some areas.

The latest estimate of the area planted to cotton in Italian Somalia in 1930-31 is 13,700 acres compared with 26,800 in 1929-30 and 11,200, the average for the preceding five seasons ; percentages : 51.3 and 122.6. Production amounts to 22,100 centals (4,600 bales) of ginned cotton against 36,200 (7,500) in 1929-30 and 17,700 (3,700), the average ; percentages : 61.0 and 125.0.

Anglo-Egyptian Sudan : According to the latest provisional estimate communicated by the Sudan Government the area cultivated during the season 1930-31 was 387,200 acres as against 369,300 in 1929-30 and 234,900, the average of the preceding five seasons : percentages, 104.9 and 164.9. The production is 509,200 centals (106,500 bales) of ginned cotton as against 665,400 (139,200) in 1929-30 and 508,000 (106,300), the average of the preceding five seasons : percentages, 76.5 and 100.2.

FLAX *

Belgium : Flax sowings have been effected under good conditions and have sprouted well. A diminution in areas to be sown is anticipated.

Great Britain and Northern Ireland : Following the very bad prices ruling this season, a very considerable decrease in the area sown is expected in Northern Ireland.

Area and Crop Condition of Flax.

COUNTRIES	AREA SOWN					CROP CONDITION (†)														
	1930-31	1929-30	Average 1924-25 to 1928-29	% 1930-31		1-V-1931									1-IV-1931			1-V-1930		
				1929-30 = 100	Aver. = 100															
1,000 acres					a)	b)	c)	a)	b)	c)	a)	b)	c)							
Czechoslovakia . .	27	31	52	87.0	53.3	—	—	—	—	—	—	—	—	—	—					
Yugoslavia (1). . .	17	17	—	97.8	—	—	—	—	—	—	—	—	—	—	—					
Canada	661	582	563	113.6	117.3	—	—	—	—	—	—	—	—	—	—					
India	2,299	2,332	2,810	98.6	81.8	—	—	—	—	—	—	—	—	—	—					
Tunisia	5	—	6	—	84.9	—	100	—	—	—	—	—	—	—	—					

For the explanation of a), b), c), d), †), see note page 260. — (1) Winter crops.

* For Yugoslavia see page 280.

Hungary : Towards the end of April flax sowing was in progress.

Italy : In the latter half of April flowering took place in several important producing districts.

Uruguay : Production of linseed in the season 1930-31, according to the latest Government estimate, is 2,575,000 centals (4,599,000 bushels), against 1,801,000 (3,216,000) last year, and 1,067,000 (1,905,000) the average for the preceding quinquennium ; percentages : 143.0 and 241.4. This estimate, which the Government states to be still subject to revision, shows a decrease of 597,000 centals (1,966,000 bushels) compared with the first estimate published in the Bulletin of last March but still constitutes a record for Uruguay.

Algeria : This year about 370 acres have been sown to flax ; crop condition on May 1, was considered to be *average* (100), while it was *good* (110) on May 1, 1930.

OTHER PRODUCTS

Tea.

India : In North India, according to a report received dated April 16th, the weather generally had been too hot and dry and the outlook was not very satisfactory. In South India the prolonged drought was having an adverse effect on the bushes and rain was badly wanted.

In North India plucking for the new season was starting. The outturn in South India during March was behind that for the same month last year and it was considered that the outlook would be unpromising unless rain fell soon.

Cacao.

French Cameroons : The production of cacao in 1930 is estimated at 233,000 centals, showing an increase of 5.5 % over that of the preceding season (221,000) and of 78.2 % over the five-year average of 1942-28 (131,000).

Groundnuts.

French West Africa : In Senegal the crop was very satisfactory. This result is due partly to efforts made by the natives to extend the area cultivated and also to a better selection of the seed distributed.

In Mauritania, the crop was only average.

Rapeseed and Sesamum (*).

Austria : Colza sowings are somewhat thin. At the beginning of May the crop began to flower. At this period its crop condition was 2.5 against 2.9 on April 1 of this year and 2.3 on May 1, 1930.

Hungary : Unfavourable weather in the first three weeks of April hindered the development of the colza crop. In some places frost damage was recorded.

India : The estimates for sesamum of the supplementary final report are as follows : Area : 1930-31 ; 1929-30 ; average 1924-25 to 1928-29 : 5,551,000 ; 5,345,000 and 5,243,000

(*) For Yugoslavia see page 278.

acres respectively ; percentages : 103.9 and 105.9. Production : 11,715,000 centals (586,000 short tons) ; 10,192,000 (510,000) and 10,662,000 (5,33,000) respectively ; percentages : 114.9 and 109.9.

Jute.

India : Light rains fell over Bengal in the first part of April ; in the latter part of the month light scattered showers fell in East and North Bengal and more was needed for the sowing of jute in the West.

Tobacco (*).

Hungary : Towards the end of the third week of April, tobacco plants were still protected in the beds. Their development was slow due to the cold.

Italy : In April transplanting had scarcely begun in some provinces of the centre and South, and vegetation is already considerably in arrears.

United States : On about April 23 moisture was needed in parts of the South-west for transplanting tobacco while some had been set out in beds in Wisconsin. In the last week of April weather was cool and wet.

Algeria : Since the beginning of March weather conditions have favoured the crops and considerably improved the situation. Re-sowing was effected in April under good conditions. The last sowings are in good shape and will partly compensate for the loss of earlier ones. The recovery is generally satisfactory although not altogether uniform.

Hops (*).

Hungary : Cold weather and the lack of precipitation in the first half of April have retarded the growth of hops.

Hemp (*).

Hungary : Towards the end of April, hemp sowing was in progress.

Italy : In April sowings were continued and the crop shows good development.

Sericulture.

Italy : General cold and wet weather has considerably delayed the growth of the leaves ; it is not possible at present to ascertain the quantity of eggs that will be incubated.

In the second week of May weather improved everywhere and the sericultural situation was ameliorated. Vegetation of the mulberries is backward and losses have consequently been experienced in districts where incubation had begun at the usual period ; development of the leaves, owing to the recent warm weather, gives promise, however, of good results. In some isolated cases attacks of diaspis are reported and in other districts losses through the severe hailstorms in the summer of last year. Generally the eggs are scarcely opened but in the Veneto and in Tuscany the cocoons are in the first stage of development and are making good progress.

(*) For Yugoslavia see page 280.

TOTALS OF WORLD AGRICULTURAL PRODUCTION

The following totals have been obtained from the data in the tables published for each product in January, which have been revised and completed. With the name of each product is indicated the number of countries for which data for 1930 are at present available and also the percentage of their total production in 1929 to world production in the same year as published in the 1929-30 Yearbook, when they comprised nearly all producing countries except China.

Crop, number of countries comprised in the total, and percentages of world production	AREA					PRODUCTION																
	1930 and 1930-31	1929 and 1929-30	Average 1924 to 1928	Percentages for 1930 and 1930-31		BRITISH WEIGHTS			AMERICAN WEIGHTS			Percentages for 1930 and 1930-31										
			1929 and 1924-25 to 1928-29	Average 1929-1930 = 100	1930 and 1930-31	1929 and 1929-30	Average 1924 to 1928 and 1924-25 to 1928-29	1930 and 1930-31	1929 and 1929-30	Average 1924 to 1928 and 1924-25 to 1928-29	1930 and 1929-30 = 100	Average 1929-1930 = 100										
			thousand acres	%	%	thousand centals			thousand bushels (60 pounds)	thousand bushels (56 pounds)	thousand bushels (48 pounds)	thousand bushels (32 pounds)	thousand bushels (56 pounds)	thousand bushels (43 pounds)	thousand bushels (60 pounds)	thousand short tons	thousand bales (478 pounds net)	thousand pounds	thousand bushels (56 pounds)	thousand gallons	thousand gallons	thousand ounces
Wheat (50 countr. 100.0 % . . . a)	247,541	241,010	231,423	102.7	107.0	2,224,203	2,078,283	2,115,726	3,706,931	3,463,735	3,528,140	107.0	105.1									
Rye (31 countries 100.0 % . . . a)	48,668	47,279	46,862	102.9	103.9	557,976	562,683	407,874	906,380	1,004,794	889,063	99.2	112.1									
Barley (44 countr. 93.0 % a)	61,184	62,836	54,250	97.2	112.8	699,769	728,068	603,416	1,457,879	1,518,709	1,257,189	96.0	116.0									
Oats (40 countries 99.0 % a)	103,900	102,706	104,572	101.2	99.4	1,168,472	1,104,920	1,172,197	3,651,448	3,734,100	3,663,091	97.8	99.7									
Maize (22 countries 87.0 % a)	153,895	151,002	148,807	101.5	103.0	1,764,693	2,079,229	2,060,743	3,151,239	3,712,910	3,679,904	84.9	85.6									
Rice (rough) (11 countr. 83.0 % . . . a)	109,699	107,028	107,389	102.5	102.2	1,686,194	1,593,087	1,583,985	3,747,022	3,540,012	3,519,896	105.8	106.5									
Potatoes (33 countr. 96.0 % a)	29,925	30,207	29,327	99.1	102.0	3,192,893	3,330,309	2,895,962	5,321,382	5,565,403	4,826,507	95.6	110.8									
Sugar-beet (23 countr. a) 24 countries (96.0 % . b)	5,639	5,367	5,184	105.1	108.8	1,377,805	1,129,877	1,101,834	68,864	56,493	55,001	121.9	125.0									
Cotton (14 countr. a) 15 countries (89.0 % . b)	72,578	76,329	74,748	95.1	97.1	97,513	102,877	104,824	20,400	21,522	21,980	94.8	98.0									
Linseed (19 countr. 99.0 % a)	15,990	13,107	14,701	122.0	108.8	69,422	52,625	72,012	123,967	93,973	128,593	131.9	96.4									
Flax (fibre) (17 countr. 98.0 % . a)	1,016	1,085	1,050	98.6	96.7	4,142	5,082	4,744	414,250	508,167	474,436	81.5	87.3									
Hemp (fibre) (8 countr. 72.0 % . a)	437	442	430	98.9	101.7	3,563	3,428	3,600	356,268	342,820	360,016	103.9	99.0									
Tobacco (14 countries 76.0 % . a)	3,062	2,970	2,634	103.1	116.2	25,802	24,410	23,056	2,560,237	2,440,966	2,305,823	104.9	111.0									
Hops (7 countries 95.0 %)	133	156	138	85.7	96.4	1,140	1,504	1,217	113,979	159,395	121,666	71.5	93.7									
Olive oil (8 countr. 96.0 %)	—	—	—	—	—	8,411	25,164	14,983	110,521	330,664	196,881	33.4	56.1									
Vines (15 c. 86.0 %).	—	—	—	—	—	(1)2,759,087 (1)3,416,637 (1)3,162,258	(1)3,313,415 (1)4,108,074 (1)3,797,587	(1)3,313,415 (1)4,108,074 (1)3,797,587	(1)3,313,415 (1)4,108,074 (1)3,797,587	(1)3,313,415 (1)4,108,074 (1)3,797,587	(1)3,313,415 (1)4,108,074 (1)3,797,587	80.8	87.3									
Silk (7 c. 99.0 %).	(a) 7,622 (a) 7,834 (a) 7,397	97.8	103.1	(3)1,052,779 (3)1,014,256 (3)862,304	(3)1,052,779 (3)1,014,256 (3)862,304	(3)1,052,779 (3)1,014,256 (3)862,304	(3)1,052,779 (3)1,014,256 (3)862,304	(3)1,052,779 (3)1,014,256 (3)862,304	(3)1,052,779 (3)1,014,256 (3)862,304	(3)1,052,779 (3)1,014,256 (3)862,304	(3)1,052,779 (3)1,014,256 (3)862,304	103.8	123.0									

a) Not including the U. S. S. R. — b) Including the U. S. S. R. — (1) Wine. — (2) Eggs in incubation. — (3) Cocoons.

Agricultural Production in Yugoslavia.

CROP	AREA HARVESTED					PRODUCTION							
	1930	1929	Aver. 1924 to 1928	Percentages for 1930		ENGLISH WEIGHTS			AMERICAN WEIGHTS			Percentages for 1930	
				1929 = 100	Aver. 1924 to 1928	1930	1929	Average 1924 to 1928	1930	1929	Average 1924 to 1928	1929 = 100	Aver. 1924 to 1928
			thousand acres		%	%	thousand centals						%
Sugar-beet . . .	127	145	105	87.6	120.9	16 415	24.197	16.286	thousand short tons 821 | 1.210 | 814			67.8	100.8
Flax (fibre) . . .	(1) 33	(1) 34	(1) 31	96.3	103.3	243	205	181	thousand pounds 24.275 | 20.533 | 18.079			118.2	134.3
Hemp (fibre) . .	(1) 93	(1) 79	(1) 77	116.6	119.6	730	579	635	22.963	57.860	63.516	126.1	114.9
Tobacco	38	38	43	100.1	88.3	314	304	329	31.399	30.406	32.048	103.3	95.3
Hops	7	13	13	56.5	55.2	39	101	62	38.731	10.065	6.180	38.5	62.7
Rapeseed . . .	29	27	10	107.6	292.4	156	163	61	th. bushels (50 pounds) 312 | 325 | 123			95.9	254.4
Cotton (ginned) .	3	2	2	133.7	196.7	3	3	2	th. bales (498 pounds net) 1 | 1 | (2)			106.4	177.0

(1) Total area, including that for seed (about 10 %). — (2) Ginned cotton. — (3) Below 500 bales.

FODDER CROPS

Germany: The growth of meadows, pastures and other fodder crops is still a little backward due to the bad April weather. Fodder plants have, on the whole, set well and good yields are anticipated from the first cutting. At the beginning of May condition of the four principal fodder crops was as follows: clover: 3.1 (1 May 1930, 2.6); alfalfa: 3.1 (2.4); irrigated meadows: 2.9 (2.3); other meadows (3.1 (2.5).

Austria: Clover fields are often thin. Growth of artificial and permanent meadows is very backward. At the beginning of May the condition of fodder crops was as follows: red clover: 2.6 against 2.6 on April 1 of this year and 2.4 on May 1, 1930; alfalfa: 3.0 (2.9, 2.6); mixed clover: 2.5 (2.5, 2.2); mixed fodder and vetches: 2.9 (2.7, 2.4); permanent meadows: 2.8 (2.7, 2.3); pastures: 3.0 (2.9, 2.7).

Belgium: The data of production of fodder crops in 1930, compared with the figures for 1929 and the average for the preceding five years are as follows:

Crop		1930	1929	Average 1924-28	% 1930	
					1929 = 100	Av. = 100
			(thousands)			
Mangolds	(centals)	137,024	100,634	102,538	136.2	133.6
	(sh. tons)	6,851	5,032	5,127		
Carrots, main crop	(centals)	638	703	608	90.7	105.0
	(sh. tons)	32	35	30		
Turnips and swedes, main crop	(centals)	4,226	4,538	4,836	93.1	87.4
	(sh. tons)	211	227	242		
Crimson clover	(centals)	5,154	3,096	5,256	166.5	98.1
	(sh. tons)	258	155	263		

Crop		1930	1929	Average 1924-28	% 1929 = 100	% 1930 Av. = 100
			(thousands)			
Red clover	(centals) . .	9,724	5,914	8,725	164.4	111.5
	(sh. tons) . .	486	296	436		
Other clover	(centals) . .	1,991	1,073	2,102	185.6	94.7
	(sh. tons) . .	100	54	105		
Alfalfa	(centals) . .	1,487	812	1,441	183.0	103.1
	(sh. tons) . .	74	41	72		
Sainfoin-esparcet	(centals) . .	523	274	552	190.8	94.9
	(sh. tons) . .	26	14	28		
Meadow-hay, mown	(centals) . .	26,287	17,119	23,307	153.6	112.8
	(sh. tons) . .	1,314	856	1,165		
Rye-grass and timothy	(centals) . .	915	768	915	119.1	100.0
	(sh. tons) . .	46	38	46		
Turnips (catch crop)	(centals) . .	73,173	41,038	66,555	178.3	109.9
	(sh. tons) . .	3,659	2,052	3,328		
Carrots " "	(centals) . .	1,697	1,670	2,106	101.6	80.6
	(sh. tons) . .	85	84	105		
Spurry " "	(centals) . .	3,408	2,620	4,605	130.1	74.1
	(sh. tons) . .	170	131	230		

Since the middle of April it has been possible to turn out young livestock on the pastures but grass shows only small growth as the nights are too cold.

Estonia : In low lying regions floods have rendered feed supplies almost impossible and a shortage is beginning to be felt.

Irish Free State : The month of April opened with a more than usually heavy down-pour of rain but conditions changed after the first few days and thereafter until the end of the month the weather was mild and favourable. Grass lands, which were bare at the beginning of the month developed well at the close of the month.

France : Rainy and cold weather during the latter half of April over the whole country checked the growth of grass, particularly in the North. With the exception of the Southwest, however, where fodder crops are not in very good condition, the situation remains good and heavy crops are expected.

Fodderseeds have sprouted well.

Great Britain and Northern Ireland : Weather in England and Wales during most of April was cold and wet. Pastures were in good colour but owing to slow growth they were insufficient for carrying much stock.

At the end of April over most of England and Wales the preparation of the land for root crops was less forward than usual; heavy lands were difficult to work and sowing was retarded except on lighter soils as a result of continuously cold and wet weather in the latter half of the month. Pulling of mangolds was in progress but was late in most districts.

The condition of temporary meadow seeds was generally good although in some areas plants were backward due to the unfavourable weather. Pastures were good in colour but owing to slow growth they were on the bare side.

The cold dry weather during April in Scotland retarded the growth of pastures in many districts and grass is generally backward. The backward season has accentuated

the scarcity of bran at Leith ; supplies are difficult to procure and prices are high. No dried grains are available. Cakes are scarce and oats have risen substantially in price ; supplies are very much shorter than they have been for some time. Millers' offals and maize on spot are short of requirements at Glasgow.

In Northern Ireland pasture lands are rather poor for the time of year as growth has been checked by the cold weather.

Hungary : Toward the end of April sowing of mangolds was in progress. In some departments fields of clover and alfalfa, which were damaged by field rats last winter, have suffered further damage by spring frosts. Growth of permanent meadows and pastures is very slow. In various places a shortage of fodder is reported, caused by the backwardness in growth of the pastures.

Italy : During the first half of April clear weather has predominated in the North and Centre, damp and rainy weather in the South. Crop condition of pasture, permanent and temporary meadows is fairly good. In the latter half of the month weather was generally rainy ; in the high mountain areas there has been snow and temperature has remained low, frosts causing damage. Vegetation is vigorous in some districts but backward in others. Temporary meadows generally give promise of good production. Development of permanent meadows is satisfactory. The first cutting has begun ; results have not been good.

Lithuania : Weather conditions in April were favourable to fodder crops.

Switzerland : Owing to the fall in temperature and the frequent night frosts growth of fodder crops on the whole experienced a notable check during April. Only toward the close of the month under the influence of rather higher temperatures and of showers, growth was a little developed, without however attaining the degree of development it has shown at the same date in normal years. Pastures have been late in beginning to green and still show feeble development ; growth of the grass is slow and backward. In many localities temporary meadows show some gaps, particularly where mixed crops including Italian rye-grass are concerned ; the delicate grasses have suffered from the heavy falls of snow experienced in March. In places the damage from mice is also important. This year a considerable retardation in the beginning of green feeding must everywhere be taken into account.

Crop condition on 1 May of permanent meadows was 3.5 against 3.6 on 1 April 1931, and 4.4 on 1 May 1930 ; that of temporary meadows was respectively 3.6, 3.6, and 4.5.

United States : In the week ending on about April 23 pastures and meadows in all parts of the country east of the Rocky Mountains showed general improvement ; the increased moisture in central sections was beneficial.

Weather in the last week of April was mostly cold and wet, except in the far North west, where weather was rather warm.

The crop condition of meadows for hay on May 1 was 79.4 against 79.9 on May 1, 1930 and 86.4, the ten year average of 1920-29. Corresponding data for pasture are 78.8, 77.3 and 81.9.

Algeria : Weather during April favoured meadows and fodder crops. Temporary meadows are in good condition but permanent meadows still yield a poor supply.

French Morocco : The month of April, marked by the alternation of rainy days and sunny days, was favourable to meadows and fodder crops. Temporary and permanent meadow crops are dense and tall.

LIVESTOCK AND DERIVATIVES

Condition of Livestock and Dairy Production.

Irish Free State : Grass grew well during April and promised good pasturage for livestock. Stocks of fodder on hand are adequate for all requirements.

Milk yields showed the usual seasonal increase but the supplies were rather below average.

Great Britain and Northern Ireland : The milk yield is a fair average in most districts. Serious loss among dairy cows is reported from Berwick through suckling cows being affected with a form of grass sickness or milk fever, most cases having proved fatal.

In Northern Ireland dairy cattle are in normal health. Milk supplies remained normal for the time of year.

Italy : Supplies of fodder in April were adequate.

Lithuania : The good crops of fodder plants and cereals obtained last year have been of great benefit in feeding livestock and milk production is normal.

Switzerland : On the average of the first quarter of 1931 deliveries of milk showed a decrease of 8.03 % with respect to the corresponding period of last year. The decrease amounted to 8.16 % in January, 7.50 % in February and 8.45 % in March. The relatively marked decrease in production is primarily due to the fact that the quality of dry fodder harvested in the previous year was poor, a qualitative deficit that was not compensated for by increased purchases of concentrated foodstuffs. Further, greater quantities of milk have this year been utilized for stock-rearing and fattening of calves, with consequent reduction in deliveries to cheese factories and milk dépôts.

United States : At the beginning of April there were about 7 % less cattle on feed for market in the corn belt States than on the same date of last year according to the estimate of the United States Department of Agriculture, this figure reflecting the short maize supply situation. Shipments of stocker and feeder cattle into the Corn Belt for the three months January to March this year were over 20 % or 100,000 head smaller than for the same period of 1930, the decrease consisting of calves, cows, heifers and light weight steers while there was a marked increase in the case of heavy feeders.

Feeders report intentions to market about the same proportion of cattle on feed in April before July this year as last year.

According to the official early lamb situation report of April 1, weather and feed conditions in the Northwestern States during March were exceptionally favourable for early lambs and for the growth of spring feed. Pastures were late in some other producing States due to lack of rain or low temperatures, and were poor in the Corn Belt States but on the whole prospects seemed favourable and percentages of lambs saved were generally high.

In the week ending on about April 23 in the Rocky Mountain region new range grass was making only slow growth in places and some feeding was necessary locally. In other portions of the West range conditions were mostly satisfactory except in the far Southwest, where they were too dry. Lambing and shearing were progressing under favourable conditions while livestock were gradually moving to summer ranges in good condition.

French West Africa : At the end of last year the condition of livestock was in general good over the whole territory, except in Mauritania where the earliness of the drought and the ravages of crickets, gave rise to unfavourable conditions and cattle disease abated more slowly than usual.

Algeria : Conditions in April favoured raising and livestock have nearly recovered from the general weakness caused by the cold and poverty of the winter.

French Morocco : Thanks to favourable weather and the abundance of grass, conditions at the end of April were very satisfactory for the maintenance of livestock ; the animals had regained their normal appearance and were in good conditions.

Union of South Africa : Examination of the total exports of wool from Union ports for the nine months July 1930 to March 1931 seems to indicate a yield considerably less than was anticipated on the basis of the number of woolled sheep in the Union on 30 June 1930 and reports from the producing areas. It is possible, in fact, that the previous year's figures will not be exceeded. The total exports for the nine months were 213,173,000 lb. greasy and 3,834,000 lb. scoured wool, respectively 11,319,000 lb. and 893,000 lb. less than for the corresponding period last season.

Returns from the ports show a falling off in arrivals into store.

Livestock in Belgium.

According to the latest information received from the Ministry of Agriculture, the numbers of livestock on December 31, 1930 were as follows:—

Year	Horses for agricultural purposes	Cattle	of which dairy cows	Pigs	of which under six months
1930	245,971	1,758,654	925,556	1,249,621	680,867
1929	249,014	1,738,348	911,720	1,237,002	675,374
1928	253,314	1,750,541	907,730	1,139,131	621,362
1927	256,465	1,738,814	901,902	1,124,243	609,824
1926	250,287	1,711,702	891,786	1,143,860	626,730
1925	250,024	1,654,767	856,352	1,151,719	625,541
1924	252,314	1,627,655	839,076	1,139,073	625,961
1923	243,184	1,602,728	820,692	1,176,430	652,467
1922	230,451	1,516,769	787,092	1,139,387	625,673
1921	222,055	1,514,953	779,966	975,743	526,784
1913	267,160	1,849,484	936,800	1,112,293	746,674

After a slight decrease in the number of cattle in 1929 compared with the preceding year, the number increased in 1930 by 1.2 % over that of 1929. There was a parallel increase in dairy cows, which represent half of the total number of cattle. The total figures for cattle, however, and those for dairy cows are still at a lower level than in the pre-war period. The percentage comparisons for the numbers of these two kinds of cattle in relation to the year 1913 are 95.1 and 98.8 respectively.

Pigs are also constantly increasing in number and the figure for 1930 is above that for the pre-war period by over 100,000 head or 12.3 %.

In the case of horses used for agricultural purposes there may be remarked, on the contrary, a decrease since 1928 ; the number in 1930 was 95.9 % of that of 1927 (the maximum for the post-war period) and 92.1 % of the number in 1913.

Yugoslavia : In the following table are given the final data, published by the Ministry of Agriculture of the areas harvested and production of the principal industrial crops in 1930 compared with those of the preceding year and the average of the preceding quinquennium.

Livestock in Uruguay.

The results of the 1930 census for cattle and sheep, compared with those of the 1919 and 1924 censuses, are as follows :

Year	Cattle	Sheep
1930	7,127,912	20,558,124
1924	8,431,613	14,443,341
1916	7,802,442	11,472,852

It will be observed that, while for cattle a diminution of 674,530 head with respect to the numbers in 1916 and of 1,303,701 with respect to those of 1924 has occurred, for sheep there has been a marked tendency to increase, the numbers having doubled with respect to those of 1916. Market quotations have had a decisive influence on these variations. In fact, the war stimulated an increase in prices of cattle, and so a rapid intensification throughout the country in cattle-rearing. This explains how the numbers of cattle increased in the seven years 1915-1922 despite the greater exports in these years.

The crisis toward the middle of 1921 caused a gradual decrease in the number of cattle, with the result that their number in 1930 was 15.46 % less than in 1924. On the contrary, the higher prices of mutton from 1924 to 1929 accentuated the tendency to increase already shown, the breeders, aided by special credits, being able to increase their flocks rapidly.

In the following tables are indicated the sex and age of cattle and sheep, the census data for 1930 being compared with those for 1924.

Cattle	1930	1924
Totals	(1) 7,127,912	8,431,613
Bulls	105,878	108,957
Young bulls from 1 to 2 years	90,424	73,466
Cows for breeding	2,418,102	2,693,269
Cows for winter milking	373,302	431,688
Bullocks	987,421	1,230,765
Oxen	260,018	333,105
Other cattle from 1 to 3 years	1,044,236	1,318,046
Other cattle over 3 years	391,820	703,144
Male calves under 1 year	756,995	827,091
Female calves under 1 year	669,386	712,082

Sheep	1930	1924
Totals	20,558,124	14,443,341
Rams	307,952	203,780
Ewes	11,918,799	8,115,279
Castrated sheep	3,669,007	2,374,379
Male lambs	2,219,886	1,889,563
Female lambs	2,394,340	1,860,340
Sheep in transit	48,140	—

(1) In the total are included 30,330 head in transit at the time of the Census.

The numbers of cows and of bullocks in 1930 show a decrease of 13.21 % with respect to 1924. On the average four bulls are employed to serve 100 cows. For 2,418,102 cows for breeding on the basis of the 1930 census there would therefore be required 96,724 bulls, while these number actually 105,878. On the contrary, for sheep a relative deficiency in rams with respect to ewes is observed ; to serve the ewes 357,564 rams would be required ; the actual number of the latter is, however, only 307,952. This disproportion may in the future bring about a decrease in the numbers of sheep in the country.

TRADE

COUNTRIES	MARCH				EIGHT MONTHS (August 1-March 31)				TWELVE MONTHS (August 1-July 31)	
	EXPORTS		IMPORTS		EXPORTS		IMPORTS		EXPORTS	IMPORTS
	1931	1930	1931	1930	1930-31	1929-30	1930-31	1929-30	1929-30	1929-30
Wheat. — Thousand centals (1 cental = 100 lbs).										
<i>Exporting Countries:</i>										
Bulgaria	289	0	0	11	1,122	31	0	922	66	930
Hungary	615	829	0	0	4,808	7,520	0	0	9,943	0
Lithuania	110	4	0	0	465	15	4	2	55	2
Rumania . . . . .	...	...	...	...	(1) 6,270	(1) 137	(1) 4	(1) 40	1,279	40
Yugoslavia	0	295	0	0	2,760	11,795	0	2	13,238	2
Canada	7,798	6,956	11	9	96,955	60,010	49	562	93,461	602
United States	814	1,448	721	1,470	27,862	40,182	8,115	4,824	57,274	7,885
Argentina	8,475	5,088	—	—	33,841	67,967	—	—	80,889	—
Chile . . . . .	...	...	...	...	(2) 425	(2) 9	(2) 0	(2) 0	481	0
India	4	4	919	836	1,887	245	4,306	3,358	2,758	3,931
Turkey . . . . .	...	...	...	...	(2) 168	(2) 7	(2) 7	(2) 408	24	414
Algeria . . . . .	...	...	...	...	(1) 4,632	(1) 1,497	(1) 88	(1) 487	3,206	545
Tunis . . . . .	...	...	...	...	(2) 1,283	(2) 2,467	(2) 273	(2) 79	3,362	99
Australia . . . . .	...	...	...	...	(2) 33,043	(2) 12,185	(2) 0	(2) 0	24,469	0
<i>Importing Countries:</i>										
Germany	18	53	752	970	265	2,266	11,338	24,546	2,293	31,725
Austria	0	2	401	269	84	29	2,961	3,642	68	4,645
Belgium	150	44	2,458	2,194	732	677	17,970	17,104	805	25,794
Denmark	0	4	216	101	20	117	2,632	2,900	128	2,903
Spain	0	0	0	37	4	11	0	2,145	11	2,122
Estonia	0	0	2	33	0	0	271	379	0	540
Irish Free State . . . . .	...	...	...	...	(2) 18	(2) 0	(2) 3,944	(2) 3,353	0	5,547
France	20	710	3,287	1,437	968	2,861	23,810	15,000	8,907	19,854
Gr. Brit. and N. Ir.	64	31	10,798	9,226	514	1,166	84,336	79,457	1,482	114,048
Greece	0	0	1,149	1,570	0	0	8,662	8,660	0	12,339
Italy	0	0	4,451	2,302	22	4	31,967	10,443	4	27,150
Latvia . . . . .	...	...	...	...	(2) 723	(2) 809	...	...	0	1,523
Norway . . . . .	...	...	212	93	—	—	2,255	1,490	—	2,216
Netherlands	190	4	950	1,664	622	176	11,740	10,221	231	14,936
Poland	137	44	4	24	1,329	205	40	227	229	331
Portugal	—	—	13	485	—	—	172	1,107	—	3,732
Sweden	2	20	130	190	29	926	2,227	3,816	1,003	4,982
Switzerland	2	0	875	717	2	0	7,959	6,422	0	9,590
Czechoslovakia	0	0	117	210	4	68	4,083	2,374	108	3,602
Japan . . . . .	—	—	...	...	—	—	(2) 6,724	(2) 5,796	—	10,922
Syria and Lebanon . . . . .	...	...	...	...	(3) 97	(3) 0	(3) 33	(3) 112	26	146
Egypt . . . . .	...	...	...	...	(2) 2	(3) 9	(3) 505	(3) 0	49	24
Union of South Africa . . . . .	...	...	...	...	(1) 0	(1) 0	(1) 611	(1) 1,144	0	1,080
New Zealand . . . . .	...	...	...	...	(2) 0	(2) 130	(2) 71	(2) 108	130	170
Totals	16,688	16,145	27,473	23,860	226,033	212,210	238,490	212,128	312,699	316,961
Rye. — Thousand centals (1 cental = 100 lbs).										
<i>Exporting Countries:</i>										
Germany	13	443	531	68	1,210	8,131	516	1,406	10,520	1,922
Bulgaria	262	0	0	0	961	9	0	0	9	0
Hungary	216	201	0	0	1,393	2,048	0	0	2,919	0
Poland	397	419	0	0	5,064	4,813	0	13	7,293	20
Rumania . . . . .	...	...	...	...	(1) 602	(1) 340	(1) 0	(1) 0	377	0
Czechoslovakia	26	62	0	7	463	908	116	143	1,325	254
Yugoslavia	0	0	0	0	0	31	4	0	33	0
Canada	7	7	0	31	666	117	0	141	194	150
United States	15	29	—	—	73	1,336	—	—	1,378	—
Argentina	24	15	—	—	326	730	—	—	767	—
Turkey . . . . .	...	...	...	...	(2) 262	(2) 27	(2) 0	(2) 31	168	31
Algeria . . . . .	...	...	...	...	(1) 24	(1) 26	(1) 0	(1) 4	35	4
<i>Importing Countries:</i>										
Austria	0	0	196	163	9	0	1,241	1,554	2	2,857
Belgium	9	0	282	46	66	4	1,903	655	7	963
Denmark	0	0	450	454	0	2	5,207	4,105	2	6,151
Estonia	0	0	4	381	0	0	86	1,162	0	1,563
Finland	0	0	18	26	0	0	1,230	2,467	4	3,314
France	0	0	240	2	2	2	893	150	7	181
Italy	0	0	37	40	0	0	399	126	0	324
Latvia . . . . .	...	...	...	...	(2) 0	(2) 2	(2) 192	(2) 1,477	7	2,191
Lithuania	53	4	0	0	146	11	0	24	86	24
Norway	0	0	342	201	0	0	2,319	2,478	0	3,905
Netherlands	98	2	624	132	291	68	4,561	1,803	90	2,908
Sweden	0	0	22	97	0	11	432	1,521	11	2,240
Switzerland	0	0	11	9	0	0	128	117	0	154
Totals	1,115	1,372	2,379	1,747	11,556	18,728	19,236	19,437	25,241	28,574

(1) (2) (3) See notes page 294.

COUNTRIES	MARCH				EIGHT MONTHS (August 1-March 31)				TWELVE MONTHS (August 1-July 31)	
	EXPORTS		IMPORTS		EXPORTS		IMPORTS		EXPORTS	IMPORTS
	1931	1930	1931	1930	1930-31	1929-30	1930-31	1929-30	1929-30	1929-30
Wheat flour. — Thousand cents (1 cental = 100 lbs).										
<i>Exporting Countries:</i>										
Germany	2	73	11	40	117	063	148	622	1,226	710
Belgium	18	20	22	2	120	201	176	538	251	564
Bulgaria	18	0	0	0	93	7	0	0	7	0
Spain	0	4	0	0	44	55	0	0	66	0
France	465	686	35	22	4,151	1,705	421	212	3,796	392
Hungary	172	417	0	0	3,146	4,314	0	0	5,664	0
Italy	90	82	20	4	873	1,215	121	37	1,400	93
Latvia	...	...	...	...	(2)	62 (2)	20 (2)	2 (2)	42	2
Poland	71	15	2	2	500	79	15	26	154	35
Rumania	...	...	...	...	(1)	251 (1)	104 (1)	0 (1)	0	817
Yugoslavia	4	20	0	0	79	280	2	0	520	2
Canada	1,065	1,334	4	15	9,654	8,514	35	108	13,365	143
United States	1,402	2,046	0	2	10,541	17,688	2	2	25,234	2
Argentina	134	243	—	—	1,270	1,865	—	—	2,604	—
Chile	...	...	...	...	(2)	90 (2)	115 (2)	0 (2)	11	203
India	79	73	0	0	686	765	2	2	1,113	2
Turkey	...	...	...	...	(2)	20 (2)	2 (2)	9 (2)	73	7
Japan	...	...	...	...	(2)	1,830 (2)	1,356 (2)	161 (2)	181	2,304
Algeria	...	...	...	...	(1)	185 (1)	46 (1)	18 (1)	31	134
Tunis	...	...	...	...	(2)	154 (2)	82 (2)	9 (2)	2	159
Australia	...	...	...	...	(2)	5,745 (2)	5,115 (2)	0 (2)	0	6,165
<i>Importing Countries:</i>										
Austria	0	0	207	229	4	2	1,640	2,125	4	3,772
Denmark	2	2	119	123	15	22	1,129	959	31	1,440
Estonia	0	0	7	9	—	0	75	82	0	123
Irish Free State	...	...	...	...	(2)	26 (2)	35 (2)	2,130 (2)	2,114	64
Finland	...	...	108	126	—	—	1,552	1,702	—	2,487
Gr. Britain and N. Ir.	384	386	765	1,074	3,109	3,157	8,455	8,270	4,727	12,487
Greece	...	...	26	31	—	—	130	377	—	494
Norway	0	0	66	157	2	2	838	915	2	1,376
Netherlands	11	11	185	243	82	152	2,520	1,561	203	2,760
Portugal	...	...	2	2	—	—	130	86	—	152
Sweden	0	7	2	33	2	71	55	292	—	90
Czechoslovakia	0	0	2	201	9	7	2,388	2,361	13	3,333
Ceylon	...	...	24	22	—	—	306	295	—	430
Java and Madura	...	...	...	...	—	—	(2)	547 (2)	589	1,142
Indo-China	...	...	...	...	—	—	(2)	284 (2)	309	549
Syria and Lebanon	...	...	...	...	(3)	2 (3)	0 (3)	93 (3)	214	0
Egypt	...	...	...	...	(3)	0 (3)	2 (3)	2,059 (3)	2,474	4,729
Union of South Africa	...	...	...	...	(1)	7 (1)	11 (1)	181 (1)	265	31
New Zealand	...	...	...	...	(2)	2 (2)	2 (2)	126 (2)	104	181
Totals	3,340	5,399	1,627	2,427	48,901	48,322	25,759	26,911	72,624	47,842
Barley. — Thousand cents (1 cental = 100 lbs).										
<i>Exporting Countries:</i>										
Bulgaria	223	26	0	0	1,332	267	0	0	309	9
Spain	4	18	0	0	130	110	0	7	168	0
Hungary	31	53	0	0	558	2,088	0	0	2,368	0
Lithuania	2	11	0	0	13	77	0	0	143	0
Poland	295	467	0	0	2,648	4,581	0	2	5,794	2
Rumania	...	...	...	...	(1)	23,680 (1)	23,235 (1)	0 (1)	0	31,965
Czechoslovakia	49	84	0	4	2,910	2,495	2	15	2,518	15
Yugoslavia	2	7	2	4	13	236	130	154	282	150
Canada	220	60	0	2	1,612	1,197	—	7	1,250	9
United States	340	187	—	—	3,613	7,441	—	—	8,774	—
Argentina	542	507	—	—	3,250	1,832	—	—	2,575	—
Chile	...	...	...	...	(2)	317 (2)	269 (2)	0 (2)	0	897
India	0	0	0	0	2	4	0	7	26	11
Syria and Lebanon	...	...	...	...	(3)	355 (3)	267 (3)	4 (3)	20	503
Turkey	...	...	...	...	(2)	218 (2)	39 (2)	0 (2)	7	61
Algeria	...	...	...	...	(1)	1,041 (1)	1,735 (1)	4 (1)	123	2,202
Egypt	...	...	...	...	(3)	2 (3)	62 (3)	46 (3)	18	128
Tunis	...	...	...	...	(2)	161 (2)	2,390 (2)	243 (2)	22	2,652
Australia	...	...	...	...	(2)	959 (2)	225 (2)	0 (2)	0	824
<i>Importing Countries:</i>										
Germany	0	313	981	1,365	62	428	11,321	41,612	1,089	49,785
Austria	0	0	104	93	0	9	1,385	1,116	9	1,653
Belgium	139	4	802	747	492	77	7,509	5,809	176	7,657
Denmark	97	15	736	441	1,109	1,106	10,752	1,360	1,232	4,456
Estonia	...	...	0	7	—	—	18	58	—	68
Irish Free State	...	...	...	...	(2)	20 (2)	24 (2)	280 (2)	7	26
France	0	22	620	71	15	102	4,892	1,257	848	1,437
Gr. Britain and N. Ir.	33	0	1,173	825	55	22	14,617	10,540	33	14,454
Greece	...	...	4	26	—	—	78	351	—	401
Italy	0	0	79	42	0	9	584	201	9	368
Latvia	...	...	...	...	(2)	0 (2)	0 (2)	163 (2)	86	123
Norway	0	0	44	11	0	0	756	308	0	732
Netherlands	101	55	1,045	445	410	421	10,539	4,952	487	7,822
Switzerland	0	0	269	137	0	0	2,101	1,426	0	1,619
Totals	2,078	1,899	5,899	4,399	44,977	50,750	63,444	60,536	62,738	31,994

COUNTRIES	MARCH				EIGHT MONTHS (August 1-March 31)				TWELVE MONTHS (August 1-July 31)	
	EXPORTS		IMPORTS		EXPORTS		IMPORTS		EXPORTS	IMPORTS
	1931	1930	1931	1930	1930-31	1929-30	1930-31	1929-30	1929-30	1929-30
Oats. — Thousand centals (1 cental = 100 lbs).										
<i>Exporting Countries:</i>										
Germany	4	1,790	117	15	214	10,737	416	553	15,245	620
Irish Free State . . . . .	...	...	...	...	(2)	201 (2)	507 (2)	157 (2)	29	661
Hungary	0	33	2	0	11	602	35	0	728	0
Lithuania	9	15	0	0	79	84	0	0	179	0
Poland	15	141	0	7	110	988	0	57	1,803	66
Rumania . . . . .	...	...	...	...	(1)	1,155 (1)	919 (1)	0 (1)	0	1,834
Czechoslovakia	9	86	2	31	703	979	7	86	1,345	128
Yugoslavia	0	0	4	11	0	9	79	29	9	51
Canada	106	37	2	227	840	412	231	955	679	1,182
United States	7	31	20	4	93	1,316	134	26	1,576	49
Argentina	924	564	—	—	8,358	3,521	—	—	6,508	—
Chile . . . . .	...	...	...	...	(2)	1,001 (2)	214 (2)	0 (2)	0	622
Algeria . . . . .	...	...	...	...	(1)	642 (1)	212 (1)	86 (1)	108	503
Tunis . . . . .	...	...	...	...	(2)	388 (2)	602 (2)	9 (2)	0	860
<i>Importing Countries:</i>										
Austria	0	0	229	234	2	0	1,338	1,706	2	2,707
Belgium	0	0	331	236	2	2	2,584	1,724	4	2,773
Denmark	2	0	123	359	20	15	657	1,552	20	2,800
Estonia	0	0	18	22	0	0	60	60	0	106
Finland	2	0	20	46	7	0	82	287	0	476
France	4	22	152	90	15	44	1,299	1,387	77	1,671
Gr. Brit. and N. Irel.	159	119	1,402	1,054	231	203	7,335	5,756	306	9,658
Greece	—	—	0	24	—	—	0	190	—	207
Italy	0	0	249	154	0	0	2,798	930	0	1,700
Latvia . . . . .	...	...	...	...	(2)	4 (2)	0 (2)	18 (2)	82	163
Norway	2	2	2	7	4	2	2	77	2	170
Netherlands	141	24	500	397	271	137	2,421	2,727	185	3,723
Sweden	9	0	101	88	33	51	644	970	60	1,290
Switzerland	0	0	417	437	0	0	3,219	2,985	0	4,398
Australia . . . . .	...	...	...	...	(2)	51 (2)	18 (2)	0 (2)	2	49
Totals	1,393	2,873	3,691	3,443	14,433	21,574	23,611	22,338	33,429	34,133
Malze. — Thousand centals (1 cental = 100 lbs).										
FIVE MONTHS (November 1-March 31)										
<i>Exporting Countries:</i>									TWELVE MONTHS (Nov. 1-Oct. 31)	
Bulgaria	646	49	0	0	1,781	1,124	0	0	4,017	0
Hungary	18	293	185	0	194	2,081	428	4	3,351	132
Rumania . . . . .	...	...	...	...	(1)	4,059 (1)	6,451 (1)	0 (1)	0	29,424
Yugoslavia	871	1,442	0	2	4,008	5,884	7	9	12,013	2
United States	258	586	46	22	633	2,310	388	130	4,303	708
Argentina	7,584	3,578	—	—	52,453	33,907	—	—	96,331	—
Brazil . . . . .	...	...	...	...	(2)	11 (2)	311	—	328	—
Java and Madura . . . . .	...	...	...	...	(2)	465 (2)	51	—	1,759	—
Indo-China . . . . .	...	...	...	...	(2)	1,523 (2)	1,213	—	2,339	—
Syria and Lebanon . . . . .	...	...	...	...	(3)	51 (3)	146 (3)	4 (3)	434	35
Egypt . . . . .	...	...	...	...	(3)	2 (3)	9 (3)	18 (3)	4	97
Union of South Africa . . . . .	...	...	...	...	(1)	972 (1)	807 (1)	0 (1)	12,267	0
<i>Importing Countries:</i>										
Germany	0	0	470	1,272	0	0	2,873	8,177	0	18,506
Austria	0	0	390	351	0	4	2,004	1,956	18	4,812
Belgium	60	11	1,288	789	260	106	6,030	5,040	220	12,908
Denmark	0	0	717	463	0	0	3,512	2,555	0	6,250
Spain	0	0	373	445	0	0	1,658	2,811	0	3,840
Irish Free State . . . . .	...	...	...	...	(2)	0 (2)	0 (2)	2,202	29	8,047
Finland . . . . .	...	...	22	11	—	—	86	46	—	137
France	7	2	1,102	1,321	29	11	8,464	7,791	46	17,857
Gr. Brit. and N. Ir.	223	123	4,118	2,509	1,012	602	21,583	14,716	2,150	36,906
Greece . . . . .	...	...	24	11	—	—	51	123	—	165
Italy	0	2	924	1,239	4	4	5,650	6,486	7	15,252
Norway . . . . .	...	...	613	271	—	—	1,027	937	—	2,676
Netherlands	20	60	2,490	1,817	161	243	13,058	10,355	626	23,177
Poland	0	0	13	22	0	0	85	112	4	92
Portugal . . . . .	...	...	93	84	—	—	966	421	—	1,443
Sweden . . . . .	...	...	571	181	—	—	2,443	869	—	2,202
Switzerland	0	0	247	196	0	0	1,431	1,196	0	2,542
Czechoslovakia	0	0	1,107	401	0	0	4,015	2,143	2	5,443
Canada	0	0	243	602	4	0	1,953	3,893	4	7,573
Japan . . . . .	...	...	...	...	0	0	386 (2)	456	—	1,486
Tunis . . . . .	...	...	...	...	(2)	0 (2)	148 (2)	0	2	0
Totals	9,697	6,146	15,996	12,060	67,632	55,964	81,826	72,442	168,771	163,666

(1) (2) (3) See notes page 294.

COUNTRIES	MARCH				THREE MONTHS (January 1-March 31)				TWELVE MONTHS (January 1-Dec. 31)	
	EXPORTS		IMPORTS		EXPORTS		IMPORTS		EXPORTS	IMPORTS
	1931	1930	1931	1930	1931	1930	1931	1930	1930	1930
Rice. — Thousand centals (1 cental = 100 lbs).										
<i>Exporting Countries:</i>										
Spain	57	115	0	0	146	342	0	0	1,252	0
Italy	291	346	2	4	1,076	1,069	4	11	4,716	134
United States	214	214	46	40	855	763	130	126	2,621	293
India	6,058	10,375	60	0	12,615	19,681	68	9	57,318	139
Indo-China	—	—	—	—	(2) 2,302	(2) 5,897	—	—	24,727	—
Siam	2,544	1,960	—	—	6,748	6,898	—	—	20,568	—
Egypt	—	—	—	—	(3) 110	(3) 176	(3) 4	(3) 42	1,206	251
<i>Importing Countries:</i>										
Germany	55	93	295	205	168	295	750	774	1,594	5,508
Austria	0	0	61	46	0	0	156	143	0	606
Belgium	13	0	137	71	37	2	231	198	9	1,047
Denmark	0	0	11	4	0	0	37	35	0	139
Estonia	—	—	2	2	—	—	4	9	—	35
Irish Free State	—	—	—	—	(2) —	(2) 0	(2) 9	(2) 9	0	46
France	66	190	325	313	201	549	996	1,116	1,903	5,650
Gr. Brit. and N. Ir.	24	20	256	190	57	57	518	470	218	2,564
Greece	—	—	46	40	—	—	130	121	—	536
Hungary	0	2	29	7	0	4	82	55	9	388
Latvia	—	—	—	—	(2) 0	(2) 2	(2) 24	(2) 4	7	62
Lithuania	0	0	—	4	0	0	7	20	—	81
Norway	—	—	11	7	—	—	24	20	0	101
Netherlands	265	172	115	75	542	423	419	229	2,035	3,563
Poland	4	2	2	0	22	9	419	165	126	1,177
Portugal	—	—	40	57	—	—	97	176	—	941
Sweden	—	—	0	0	—	—	0	0	—	161
Switzerland	0	0	33	26	0	0	104	82	0	408
Czechoslovakia	0	0	57	40	0	0	141	148	0	970
Yugoslavia	0	0	37	20	2	0	115	73	2	516
Canada	0	0	84	104	0	0	223	187	0	584
Chile	—	—	—	—	—	—	(2) 84	(2) 07	—	518
Ceylon	0	2	924	979	2	2	2,789	3,042	9	10,800
Java and Madura	—	—	—	—	(2) 26	(2) 2	(2) 1,360	(2) 2,216	117	5,487
Japan	—	—	—	—	(2) 593	(2) 13	(2) 256	(2) 809	1,252	3,973
Syria and Lebanon	—	—	—	—	(3) 0	(3) 0	(3) 22	(3) 26	2	320
Turkey	—	—	—	—	(2) 0	(2) 0	(2) 26	(2) 20	2	203
Algeria	—	—	—	—	—	—	—	—	9	104
Tunis	—	—	—	—	(2) 0	(2) 0	(2) 4	(2) 2	0	24
Union of S. Africa	—	—	—	—	—	—	—	—	0	930
Australia	—	—	—	—	(2) 18	(2) 18	(2) 9	(2) 13	71	75
New Zealand	—	—	—	—	(2) 0	(2) 0	(2) 9	(2) 13	0	66
Totals	9,391	14,011	2,568	2,294	25,579	36,197	8,839	10,456	119,993	48,383

Linseed. — Thousand centals (1 cental = 100 lbs).										
<i>Exporting Countries:</i>										
Estonia	0	0	0	0	2	2	0	0	55	2
Lithuania	24	4	0	0	104	51	0	0	443	—
Argentina	4,288	2,374	—	—	14,958	10,520	—	—	25,466	—
India	117	192	0	0	276	361	0	0	5,763	0
Tunis	—	—	—	—	(2) 0	(2) 0	(2) 0	(2) 0	9	0
<i>Importing Countries:</i>										
Germany	2	2	1,008	650	4	7	2,083	1,453	26	5,104
Belgium	7	22	414	137	18	29	1,023	342	68	1,676
Denmark	—	—	29	26	—	—	99	68	—	359
Spain	—	—	35	22	—	—	97	68	—	419
Finland	0	0	13	13	0	0	24	15	0	79
France	7	0	507	370	9	4	1,041	728	15	4,283
Gr. Brit. and N. Irel.	2	0	1,124	578	2	4	2,218	1,102	9	5,031
Greece	0	0	4	0	0	0	20	9	2	84
Hungary	2	2	0	11	2	4	2	26	143	106
Italy	0	0	84	78	0	0	247	165	0	1,175
Latvia	—	—	—	—	(2) 33	(2) 24	(2) 13	(2) 22	236	166
Norway	—	—	68	55	—	—	134	88	—	267
Netherlands	13	31	1,140	809	22	73	2,191	1,272	140	5,817
Poland	0	0	24	26	2	15	38	44	31	150
Sweden	—	—	126	96	—	—	238	146	—	798
Czechoslovakia	0	2	46	31	2	2	71	40	18	445
Yugoslavia	0	0	35	11	0	2	44	15	2	121
Canada	0	2	0	126	2	2	0	159	783	454
United States	—	—	734	1,810	—	—	1,466	3,688	—	7,090
Japan	—	—	—	—	—	—	(2) 24	(2) 0	—	126
Australia	—	—	—	—	(2) 0	(2) 0	(2) 189	(2) 73	0	340
Totals	4,462	2,631	5,396	4,924	15,436	11,129	11,397	9,322	33,315	34,258

(2) (3) See notes page 294.

COUNTRIES	MARCH				THREE MONTHS (January, 1-March 31)				TWELVE MONTHS (January 1-Dec. 31)	
	EXPORTS		IMPORTS		EXPORTS		IMPORTS		EXPORTS	IMPORTS
	1931	1930	1931	1930	1931	1930	1931	1930	1930	1930
Butter. — (Thousand lbs.)										
<i>Exporting Countries:</i>										
Austria	227	395	22	2	1,076	1,435	28	20	4,112	545
Denmark	28,733	28,396	132	64	86,688	85,663	196	201	372,558	1,889
Estonia	1,378	1,243	0	0	3,878	3,845	0	0	31,010	0
Irish Free State . . . . .	...	...	...	...	(2) 580	(2) 1,085	(2) 1,896	(2) 1,799	58,815	3,391
Finland	6,444	3,816	0	0	9,793	10,490	0	0	37,726	7
France	690	787	6,673	2,529	2,388	2,061	16,962	6,230	12,095	12,924
Hungary	73	51	0	0	478	957	0	0	3,430	40
Latvia . . . . .	...	...	...	...	(2) 4,000	(2) 4,968	(2) 4	(2) 7	40,630	49
Lithuania	827	439	0	0	2,033	1,393	0	0	16,219	0
Netherlands	6,259	6,962	287	206	15,289	19,231	1,792	911	92,394	4,396
Poland	1,620	1,466	0	2	5,013	4,850	2	4	28,774	29
Sweden	4,010	5,527	0	0	12,957	16,700	2	2	58,857	18
U. S. S. R. . . . .	...	...	...	...	...	...	...	...	23,149	...
Argentina	5,529	4,544	...	...	20,098	15,779	...	...	51,156	...
India	33	53	26	26	126	201	73	64	2,161	282
Syria and Lebanon . . . . .	...	...	...	...	(3) 280	(3) 520	(3) 7	(3) 13	5,611	172
Australia . . . . .	...	...	...	...	(2) 35,507	(2) 30,228	(2) 0	(2) 0	156,411	2
New Zealand	25,166	17,992	...	...	71,800	76,360	...	...	208,170	...
<i>Importing Countries:</i>										
Germany	29	40	15,225	19,317	75	137	40,439	61,747	578	293,560
Belgium	196	245	3,303	1,616	558	507	10,298	5,267	2,648	22,412
Spain	4	13	4	20	22	37	11	82	161	328
Gr. Brit. and N. Irel.	5,397	1,347	63,008	63,487	16,716	5,415	205,531	194,162	21,028	764,782
Greece . . . . .	...	...	86	73	...	...	...	...	...	1,420
Italy	90	216	1,340	247	229	313	2,826	736	1,843	3,115
Norway	260	64	11	7	547	227	55	60	236	1,580
Switzerland	0	4	2,059	1,296	2	11	5,467	3,702	42	18,766
Czechoslovakia	15	106	20	2	395	390	37	9	694	714
Canada	64	73	1,182	8,029	172	190	2,090	24,205	1,179	38,605
United States	141	328	99	179	366	1,038	306	474	2,967	2,471
Ceylon . . . . .	...	...	51	62	...	...	157	165	...	723
Java and Madura . . . . .	...	...	...	...	...	...	(2) 1,722	(2) 1,431	...	7,557
Japan . . . . .	...	...	...	...	...	...	(2) 53	(2) 192	...	611
Algeria . . . . .	...	...	...	...	...	...	...	...	82	3,232
Egypt . . . . .	...	...	...	...	(3) 0	(3) 0	(3) 287	(3) 291	42	2,417
Tunis . . . . .	...	...	...	...	(2) 0	(2) 148	(2) 150	13	829	...
Totals	84,194	74,127	93,533	97,170	291,111	283,728	299,696	302,222	1,197,671	1,196,336
Cheese. — (Thousand lbs.)										
<i>Exporting Countries:</i>										
Denmark	791	924	64	49	2,231	2,974	181	150	12,626	809
Finland	511	302	0	2	1,601	1,005	0	0	4,833	35
Italy	8,274	7,121	827	825	19,656	17,483	2,066	2,427	80,688	12,562
Lithuania	170	95	2	2	511	306	2	2	1,960	11
Norway	163	117	79	83	487	337	165	192	1,880	750
Netherlands	13,906	14,551	126	123	41,742	44,483	324	377	206,739	1,510
Poland	216	157	63	65	730	489	181	238	3,267	1,074
Switzerland	5,095	5,265	507	373	14,110	15,448	1,440	1,127	66,146	4,251
Czechoslovakia	558	494	240	179	2,251	1,279	622	545	8,274	2,963
Yugoslavia	318	53	22	26	542	381	62	75	4,583	300
Canada	492	456	150	165	1,715	2,288	324	428	66,955	1,779
Australia . . . . .	...	...	...	...	(2) 1,510	(2) 979	(2) 7	(2) 49	7,273	150
New Zealand	31,326	24,467	0	0	75,676	68,460	0	0	201,256	7
<i>Importing Countries:</i>										
Germany	536	443	8,501	9,341	1,623	1,440	26,676	29,662	5,410	137,459
Austria	278	139	618	448	1,054	558	1,226	1,140	4,482	5,637
Belgium	86	60	3,523	3,754	174	179	11,096	11,394	680	51,394
Spain	22	172	232	403	51	183	851	1,226	373	5,836
Irish Free State . . . . .	...	...	...	...	(2) 40	(2) 29	(2) 421	(2) 366	194	2,360
France	3,206	3,688	7,163	5,031	9,606	10,170	18,592	13,878	38,621	65,524
Gr. Brit. and N. Irel.	562	607	80,748	20,348	1,850	2,130	88,315	90,163	8,927	348,562
Greece	0	24	256	188	29	57	683	981	262	2,302
Hungary	20	7	29	49	40	18	86	119	93	386
Portugal . . . . .	...	...	51	51	...	...	99	137	...	1,010
Sweden . . . . .	...	...	146	104	...	...	362	304	...	1,470
United States	245	192	4,610	5,247	562	604	12,738	15,003	2,180	68,313
India	0	0	68	77	...	...	2	280	280	7
Java and Madura . . . . .	...	...	...	...	...	...	(2) 203	(2) 214	...	1,671
Syria and Lebanon . . . . .	...	...	...	...	(3) 0	(3) 2	(3) 60	(3) 66	132	780
Algeria . . . . .	...	...	...	...	...	...	...	...	312	10,897
Egypt . . . . .	...	...	...	...	(3) 11	(3) 11	(3) 686	(3) 790	60	7,553
Tunis . . . . .	...	...	...	...	(2) 2	(2) 826	(2) 263	28	1,746	...
Totals	64,394	59,434	56,670	54,453	177,964	171,399	166,148	171,779	726,136	736,704

(2) (3) See notes page 394.

COUNTRIES	MARCH				EIGHT MONTHS (August 1-March 31)				TWELVE MONTHS (August 1-July 31)	
	EXPORTS		IMPORTS		EXPORTS		IMPORTS		EXPORTS	IMPORTS
	1931	1930	1931	1930	1930-31	1929-30	1930-31	1929-30	1929-30	1929-30
Cotton. — Thousand cents (1 cental = 100 lbs).										
<i>Exporting Countries:</i>										
United States	3,243	2,579	51	141	29,674	30,905	258	1,219	5,927	1,889
Argentina	4	7	—	—	220	216	—	—	597	—
Brazil	—	—	—	—	(2) 377	(2) 1,246	—	—	1,351	—
India	1,728	2,002	168	40	10,450	10,172	—	234	15,172	600
Egypt	—	—	—	—	(3) 3,408	(3) 3,960	(3) 0	(3) 0	1,367	0
<i>Importing Countries:</i>										
Germany	137	154	531	602	1,162	1,257	6,001	6,753	1,885	8,944
Austria	0	0	40	49	0	2	326	395	2	562
Belgium	22	9	196	183	115	77	1,138	1,388	106	2,037
Denmark	—	—	18	11	—	—	104	90	—	146
Spain	0	2	256	251	15	37	1,543	1,528	44	2,207
Estonia	0	0	4	4	0	0	62	104	0	130
Finland	0	0	15	11	0	0	128	104	2	143
France	42	49	502	807	368	414	6,191	6,105	668	8,272
Gr. Brit. and N. Irel.	37	29	1,023	913	320	368	8,278	10,306	769	13,151
Greece	—	0	18	7	0	2	137	46	2	68
Hungary	—	—	22	22	—	—	192	106	—	291
Italy	0	0	370	516	2	9	2,612	3,657	0	5,148
Latvia	—	—	—	—	(2) 0	(2) 0	(2) 44	(2) 53	—	77
Norway	—	—	—	—	—	—	40	35	—	46
Netherlands	0	0	84	97	4	4	694	712	7	1,027
Poland	2	2	101	77	15	18	979	844	20	1,215
Portugal	—	—	29	24	—	—	236	280	—	401
Sweden	—	—	20	35	—	—	304	302	—	516
Switzerland	0	0	35	57	0	0	445	992	0	639
Czechoslovakia	13	11	214	220	106	123	1,673	1,898	170	2,701
Yugoslavia	0	0	22	31	0	0	128	130	0	108
Canada	—	—	108	104	—	—	776	818	—	1,043
Japan	—	—	—	—	(2) 300	(2) 108	(2) 6,707	(2) 7,796	417	13,032
Algeria	—	—	—	—	(2) 2	(2) 4	(2) 0	(2) 2	33	4
Totals	5,228	4,644	3,891	4,310	46,556	48,322	46,010	45,567	63,554	64,367

Wool. — (Thousand lbs).

COUNTRIES	MARCH				EIGHT MONTHS (August 1-March 31)				TWELVE MONTHS (August 1-July 31)	
	EXPORTS		IMPORTS		EXPORTS		IMPORTS		EXPORTS	IMPORTS
	1931	1930	1931	1930	1930-31	1929-30	1930-31	1929-30	1929-30	1929-30
Wool. — (Thousand lbs).										
<i>Exporting Countries:</i>										
Spain	73	186	1,285	302	2,659	5,119	4,292	1,601	8,062	5,783
Irish Free State	—	—	—	—	(2) 3,003	(2) 6,027	(2) 203	(2) 553	10,249	994
Hungary	212	112	101	148	1,645	2,829	1,133	939	10,013	1,561
Argentina	(a) 44,375	(b) 31,462	—	—	185,526	152,900	—	—	277,391	—
Chile	—	—	—	—	(2) 30,569	(2) 3,929	—	—	6,206	—
India	1,770	3,966	157	406	17,456	30,364	875	2,039	20,318	4,189
Syria and Lebanon	—	—	—	—	(3) 4,138	(3) 5,732	(3) 1,640	(3) 472	7,825	1,810
Algeria	—	—	—	—	(1) 8,640	(1) 4,043	(1) 304	(1) 364	14,897	1,965
Egypt	—	—	—	—	(3) 895	(3) 1,224	(3) 2	(3) 0	2,535	2
Tunis	—	—	—	—	(2) 93	(2) 273	(2) 422	(2) 423	551	1,113
Un. of S. Africa	(a) —	(b) —	—	—	(1) 120,192	(1) 139,846	(1) 33	(1) 4	288,877	0
Australia	(a) —	(b) —	—	—	(2) 1,204	(2) 2,224	(2) 430	(2) 185	7,401	293
New Zealand	(a) 31,897	(b) 25,309	0	9	(2) 500,570	(2) 414,025	(2) 573	(2) 2,229	738,152	2,837
—	(a) 7,388	(b) 4,555	0	0	(2) 21,008	(2) 20,957	(2) 37	(2) 507	47,375	604
—	—	—	—	—	96,254	111,338	0	11	156,771	13
—	—	—	—	—	20,404	17,648	0	0	43,473	7
<i>Importing Countries:</i>										
Germany	(a) 1,792	(b) 620	21,638	24,776	6,008	8,219	171,670	143,096	11,188	204,117
Austria	(a) 1,168	(b) 1,279	2,540	1,585	7,081	9,839	16,524	16,878	14,966	28,609
Belgium	(a) 20	(b) 44	1,759	1,550	196	265	8,184	8,717	366	16,655
Denmark	(a) —	(b) —	—	—	(2) 6,290	(2) 4,846	(2) 58,065	(2) 74,386	9,006	166,968
Finland	(a) —	(b) —	—	—	(2) 10,291	(2) 12,727	(2) 1,916	(2) 1,986	25,946	4,945
France	(a) 18	(b) 11	492	333	46	101	2,284	2,147	130	3,413
Gr. Britain and N. Ir.	(a) 0	(b) 0	225	130	20	73	1,431	1,014	86	1,929
Greece	(a) 6,023	(b) 4,590	24,915	44,119	31,299	35,353	257,913	271,632	55,931	546,384
Italy	(a) 251	(b) 82	8,223	8,794	1,164	1,001	59,397	46,945	2,024	95,006
Norway	(a) 838	(b) 101	551	1,025	1,872	1,409	5,410	7,787	2,835	13,109
Netherlands	(a) 66	(b) 88	172	170	384	663	1,030	1,135	968	1,885
Poland	(a) 247	(b) 110	1,422	1,376	1,199	1,248	6,382	5,768	2,112	10,582
Sweden	(a) 24	(b) 15	714	518	174	340	4,011	3,816	527	8,257
Switzerland	(a) 355	(b) 128	1,593	909	1,605	2,090	17,198	18,767	3,338	34,745
Czechoslovakia	—	—	926	1,790	—	—	7,468	8,695	—	15,761
Yugoslavia	—	—	1,336	1,343	179	18	11,063	10,739	55	19,178
Canada	—	—	1,638	3,468	780	1,296	16,674	17,966	2,273	86,190
United States	207	366	2,059	1,263	1,098	8,726	6,896	5,928	8,191	9,778
Japan	110	143	15,349	20,049	780	1,316	78,079	142,399	2,017	208,681
Totals	112,617	83,835	186,506	215,324	1,325,489	1,192,341	1,966,348	1,921,329	2,161,939	3,331,532

(a) = Wool, greasy; b) = Wool, scoured.

(1) (2) (3) See notes page 294.

COUNTRIES	MARCH		NINE MONTHS (July 1-March 31)		TWELVE MONTHS (July 1- June 30)	COUNTRIES	MARCH		NINE MONTHS (July 1-March 31)		TWELVE MONTHS (July 1- June 30)
	1931	1930	1930-31	1929-30	1929-30		1931	1930	1930-31	1929-30	1929-30
Coffee. (Thousand lbs.)						Tea. (Thousand lbs.)					
EXPORTS.						EXPORTS.					
<i>Exporting Countries:</i>						<i>Exporting Countries:</i>					
Brazil . . . . .	...	...	2,484,430	2,414,709	1,905,031	Ceylon	21,713	22,040	171,787	170,060	251,286
India	6,729	7,207	16,793	15,066	31,698	India	8,600	7,136	318,050	338,133	370,148
Java and Madura . . . . .	...	...	(2) 20,198	(2) 45,014	55,618	Java and Madura . . . . .	...	...	(2) 101,129	(2) 101,702	154,582
						Japan . . . . .	...	...	(2) 17,820	(2) 20,646	24,836
<i>Importing Countries:</i>						<i>Importing Countries:</i>					
Germany	117	33	1,010	340	470	Belgium	2	4	24	20	26
Belgium	617	49	2,771	772	1,041	Irish Free State . . . . .	...	(2)	110	(2)	137
France	0	0	57	20	22	France	4	4	20	46	57
Netherlands	1,744	2,474	14,055	16,801	21,268	Gr. Brit. and N. Ir.	7,979	8,298	65,427	74,230	95,771
Portugal	37	55	425	406	571	Netherlands	11	11	82	37	53
Switzerland	18	29	231	150	227	United States	40	62	379	428	542
Canada	7	9	46	64	79	Syria and Lebanon . . . . .	...	(3)	11	(3)	24
United States	1,477	2,617	17,216	13,261	16,151	Algeria . . . . .	...	(1)	11	(1)	13
Ceylon	0	55	225	545	719	Union of S. Africa . . . . .	...	(1)	35	(1)	46
Syria and Lebanon . . . . .	...	(3)	42	(3)	71	Australia . . . . .	...	(2)	66	(2)	108
Australia . . . . .	...	(2)	37	(2)	49	New Zealand . . . . .	...	(2)	79	(2)	40
Totals	—	—	—	—	2,123,639	Totals	38,349	37,353	675,648	714,679	899,385
IMPORTS.						IMPORTS.					
<i>Importing Countries:</i>						<i>Importing Countries:</i>					
Germany	25,179	22,980	263,319	250,439	313,803	Germany	794	1,179	9,852	11,614	12,807
Austria	1,517	1,722	15,428	14,954	20,004	Austria	84	79	1,012	1,025	1,223
Belgium	13,153	8,946	87,994	70,947	94,902	Belgium	60	68	481	448	617
Bulgaria	105	106	1,237	1,378	1,735	Denmark	137	99	983	891	1,105
Denmark	6,678	5,785	40,055	42,435	56,513	Spain	18	20	212	225	317
Spain	4,237	5,401	39,293	36,074	54,768	Estonia	11	15	112	119	148
Estonia	15	22	231	238	233	Irish Free State . . . . .	...	(2)	16,757	(2)	15,838
Irish Free State	61	40	282	260	403	Finland	22	22	194	216	278
Finland	2,048	3,447	31,030	28,385	38,014	France	340	282	2,637	2,542	3,306
France	33,323	33,541	297,321	250,445	385,018	Gr. Britain and N.	34,046	27,388	450,088	408,502	553,356
Gr. Britain and N.	3,468	2,041	27,860	25,534	36,099	Ireland	44	35	547	505	554
Ireland	1,054	1,074	9,561	9,054	12,452	Greece	42	31	549	657	714
Greece	826	558	5,190	5,926	8,128	Hungary	29	22	240	249	337
Hungary	8,706	8,792	73,447	77,347	102,637	Italy . . . . .	...	(2)	117	(2)	154
Italy . . . . .	...	(2)	249	(2)	234	Latvia . . . . .	...	11	143	128	174
Latvia	44	35	351	340	428	Lithuania	31	35	284	289	375
Lithuania	3,099	4,594	27,340	23,933	34,335	Norway	3,009	2,784	24,388	22,287	29,366
Norway	8,292	8,905	70,845	75,127	98,986	Netherlands	474	417	3,569	3,397	4,434
Netherlands	1,570	1,486	12,994	13,230	17,668	Poland	64	42	456	522	686
Poland	988	957	8,486	7,432	9,978	Rumania . . . . .	...	(1)	578	(1)	694
Portugal . . . . .	...	(1)	5,401	(1)	5,093	Sweden	93	88	699	653	877
Rumania	8,541	7,992	73,652	74,259	99,162	Switzerland	143	132	1,261	1,166	1,567
Sweden	3,042	3,545	21,341	22,421	31,017	Czechoslovakia	110	86	1,235	1,195	1,396
Switzerland	2,831	2,762	21,239	22,326	31,458	Yugoslavia	44	40	553	712	776
Czechoslovakia	2,579	2,738	16,440	18,082	21,713	Canada	6,014	2,939	30,063	29,363	46,767
Yugoslavia	465	3,190	20,164	21,255	29,018	United States	7,964	6,354	69,878	69,305	86,399
Canada	185,729	149,710	1,256,242	1,107,413	1,562,080	Chile . . . . .	...	(2)	3,547	(2)	3,536
United States . . . . .	...	(2)	6,191	(2)	8,117	Syria and Lebanon . . . . .	...	(3)	247	(3)	278
Chile	123	123	2,663	2,513	3,150	Turkey . . . . .	...	(2)	1,475	(2)	1,475
Ceylon . . . . .	...	(2)	2,826	(2)	2,507	Algeria . . . . .	...	(1)	1,545	(1)	1,422
Japan . . . . .	...	(3)	1,064	(3)	1,519	Egypt . . . . .	...	(3)	6,773	(3)	10,600
Syria and Lebanon . . . . .	...	(2)	8,521	(2)	8,788	Tunis . . . . .	...	(2)	2,041	(2)	2,137
Turkey . . . . .	...	(1)	14,890	(1)	13,860	Union of S. Africa . . . . .	...	(2)	30,042	(2)	31,590
Algeria . . . . .	...	(3)	7,002	(3)	16,779	Australia . . . . .	...	(2)	34,317	(2)	34,550
Egypt . . . . .	...	(2)	2,224	(2)	2,736	New Zealand . . . . .	...	(2)	9,251	(2)	8,946
Union of S. Africa . . . . .	...	(1)	15,840	(1)	17,201						
Australia . . . . .	...	(1)	1,750	(1)	2,643						
New Zealand . . . . .	...	(2)	278	(2)	258						
<i>Exporting Countries:</i>						<i>Exporting Countries:</i>					
India	560	739	4,014	8,201	9,828	India	560	739	4,014	8,201	9,828
Java and Madura . . . . .	...	(2)	8,869	(2)	11,367	Java and Madura . . . . .	...	(2)	8,869	(2)	11,367
Totals	54,794	42,913	735,599	747,247	899,495	Totals	54,794	42,913	735,599	747,247	899,495

(1) (2) (3) See notes page 294.

COUNTRIES	MARCH		SIX MONTHS (Oct. 1- March 31)		TWELVE MONTHS (Oct. 1- Sept. 30)	COUNTRIES	MARCH		EIGHT MONTHS (August 1- March 31)		TWELVE MONTHS (August 1- July 31)
	1931	1930	1930-31	1929-30	1929-30		1931	1930	1930-31	1929-30	1929-1930
Cacao. (Thousand lbs.).						Total Wheat and Flour (*) (Thousand cents).					
EXPORTS.						a) NET EXPORTS					
<i>Exporting Countries:</i>						<i>Exporting Countries:</i>					
Grenada . . . . .	...	...	(1) 1,415 (1)	1,298	9,074	Bulgaria	306	...	1,246	(4)	(4)
Dominican Republ.	1,303	2,406	12,201	15,032	42,660	Spain	0	(4)	64	(4)	(4)
Brazil . . . . .	...	...	(2) 71,192 (2)	10,132	162,486	France	(4)	130	(4)	(4)	(4)
Ecuador . . . . .	...	...	(2) 10,254 (2)	10,942	39,399	Hungary	844	1,385	8,803	13,272	17,494
Trinidad	7,189	6,651	29,368	30,909	54,492	Lithuania	112	4	481	13	62
Venezuela . . . . .	...	...	(1) 4,597 (1)	8,108	38,773	Poland	223	37	1,936	49	117
Ceylon	873	650	5,485	5,205	8,445	Rumania . . . . .	...	...	(1) 6,801 (1)	236	1,662
Java and Madura . . . . .	...	...	(2) 1,034 (2)	756	2,833	Yugoslavia	7	322	2,894	12,139	18,719
Cameroon . . . . .	...	...	(3) 17,493 (3)	14,932	24,654	Canada	9,244	8,704	109,731	71,065	110,881
Ivory Coast . . . . .	...	...	(3) 13,014 (3)	12,002	47,638	United States	1,902	2,703	41,800	58,989	83,081
Gold Coast	93,815	47,490	334,352	346,496	507,506	Argentina	8,653	6,012	35,543	70,453	90,481
Nigeria	14,984	9,711	103,036	90,310	110,634	Chile . . . . .	...	...	(2) 547 (2)	148	728
St. Thomas and Frisland	2,721	2,621	18,817	25,404	33,912	British India	(4)	(4)	(4)	(4)	309
Togoland . . . . .	...	...	(3) 6,704 (3)	7,202	14,357	Turkey . . . . .	...	...	(2) 187 (2)	1,080	2,765
						Algeria . . . . .	...	...	(2) 4,766 (2)	2,493	3,488
						Tunis . . . . .	...	...	(2) 1,204 (2)	2,493	3,488
						Australia . . . . .	...	...	(2) 40,704 (2)	19,002	36,689
<i>Importing Countries:</i>						Totals	21,351	19,297	256,417	248,223	368,636
Germany	0	29	432	108	216						
Belgium	139	11	309	97	304						
France	0	0	223	37	37						
Netherlands	1,001	1,043	6,018	7,284	10,970						
Poland	0	0	0	11	13						
Czechoslovakia	0	0	13	20	20						
United States	615	842	4,403	4,246	8,956						
Australia . . . . .	...	...	(2) 37 (2)	106	276						
Totals	122,120	71,462	641,977	679,950	1,123,553						
IMPORTS.						b) NET IMPORTS.					
<i>Importing Countries:</i>						<i>Importing Countries:</i>					
Germany	12,602	11,208	90,299	97,273	165,548	Germany	745	878	11,116	21,824	28,744
Austria	1,091	904	6,166	5,814	10,080	Austria	677	373	5,057	6,444	11,407
Belgium	3,508	1,876	12,716	9,328	17,320	Belgium	2,310	2,125	17,306	16,870	25,406
Denmark	778	443	4,312	3,394	6,195	Bulgaria	(5)	11	(5)	825	855
Spain	1,625	1,288	12,954	8,501	18,047	Denmark	373	258	4,096	3,134	4,654
Estonia	44	24	231	190	386	Spain	(5)	11	(5)	2,061	2,083
Irish Free State . . . . .	...	...	(2) 839 (2)	311	855	Estonia	11	44	370	487	705
Finland	11	26	115	152	304	Irish Free State . . . . .	...	...	(2) 6,781 (2)	1,029	10,291
France	6,709	6,369	45,897	30,040	77,729	Finland	154	168	2,125	2,273	3,820
Gr. Brit. and N. Ir.	23,435	10,340	79,243	60,442	123,805	France	2,604	(5)	17,699	11,429	6,506
Greece	207	121	1,321	1,224	2,187	Gr. Brit. and N. Ir.	11,244	10,113	90,950	85,108	122,913
Hungary	556	525	2,513	2,412	4,770	Greece	1,184	1,612	8,836	9,162	12,006
Italy	1,539	1,876	8,891	8,375	14,950	Italy	4,356	2,108	30,942	8,869	25,402
Latvia . . . . .	...	...	(2) 800 (2)	957	2,035	Latvia . . . . .	...	...	(2) 644 (2)	875	1,490
Lithuania	53	53	307	300	77,729	Norway	300	302	3,369	2,710	4,948
Norway	622	540	2,339	2,791	4,903	Netherlands	1,001	1,099	14,370	11,923	18,115
Netherlands	17,555	14,989	83,829	72,094	117,981	Poland	(5)	1	(5)	...	...
Poland	1,054	970	6,799	6,484	11,903	Portugal	42	487	346	1,312	3,983
Sweden	996	1,138	4,438	5,082	8,545	Sweden	130	203	2,289	5,146	4,955
Switzerland	4,350	3,091	12,703	11,316	18,238	Switzerland	673	717	7,057	6,422	9,680
Czechoslovakia	1,415	2,057	8,470	9,299	16,691	Czechoslovakia	119	604	7,851	5,455	7,921
Yugoslavia	143	225	776	983	1,724	Ceylon	33	29	410	897	875
Canada	2,156	1,870	8,900	10,020	17,622	India	809	734	1,578	2,097	782
United States	46,910	25,973	175,852	235,415	481,014	Indochina . . . . .	...	...	(2) 309 (2)	112	356
Australia . . . . .	...	...	(2) 2,187 (2)	4,300	9,278	Japan . . . . .	...	...	(2) 4,486 (2)	4,298	1,523
New Zealand . . . . .	...	...	(2) 644 (2)	500	1,876	Java and Madura . . . . .	...	...	(2) 730 (2)	736	888
						Sri Lanka and Ceylon . . . . .	...	...	(3) 57 (3)	397	481
						Turkey . . . . .	...	...	(3) 3,247 (3)	3,387	6,374
						Egypt . . . . .	...	...	(5) 842 (5)	1,482	2,382
						Union of South Afr. . . . .	...	...	(2) 236 (2)	118	376
Totals	127,458	85,796	582,596	595,927	1,028,564	Totals	27,664	23,651	244,999	239,247	398,965

(*) Flour reduced to grain on the basis of the coefficient: 1,000 cents of flour = 1,335-33 cents of grain.

a) Excess of exports over imports. — b) Excess of imports over exports.

(1) Data up to 31st December. — (2) Data up to 28th February. — (3) Data up to 31st January. — (4) See Net Imports. — (5) See Net Exports.

STOCKS

STOCKS AND AVAILABLE SALFABLE SUPPLIES OF CEREALS AND POTATOES IN FARMERS' HANDS
IN GERMANY, ON APRIL, 15.

PRODUCTS	% Stocks: total production				% Available salvable quantities: total production			
	15-IV-31	15-III-31	15-IV-30	15-IV-29	15-IV-31	15-III-31	15-IV-30	15-IV-29
Winter wheat	8.7	13.2	14.2	15.6	5.3	8.6	9.5	9.3
Spring wheat	13.9	30.3	15.6	28.0	10.0	17.8	10.9	20.8
Winter rye	18.2	25.8	24.6	21.4	7.2	11.5	12.7	9.9
Winter barley	7.4	11.4	13.8	10.9	0.7	1.6	1.9	1.0
Spring barley	8.6	16.4	11.6	18.4	1.3	3.9	4.3	7.4
Oats	32.0	44.8	34.4	36.3	5.2	9.7	10.0	9.2
Potatoes	21.0	32.8	24.8	20.4	3.2	8.8	5.2	8.8

Authority: Preisberichtstelle beim Deutschen Landwirtschaftsrat.

VISIBLE SUPPLY OF CEREALS IN CANADA AND THE UNITED STATES (1).

PRODUCTS AND COUNTRIES	2-V-31	28-III-31	28-II-31	3-V-30	27-IV-29	2-V-31	28-III-31	28-II-31	3-V-30	27-IV-29
	1000 centals					1000 bushels				
WHEAT:										
Canada	96,450	108,150	110,220	106,454	100,702	160,750	180,250	183,700	177,424	167,837
United States	123,877	128,167	124,800	84,189	71,551	206,462	213,612	208,100	140,315	110,252
TOTAL	220,327	236,317	235,080	190,643	172,253	367,212	393,862	391,800	317,739	287,089
RYE:										
United States	5,822	7,030	7,734	7,749	4,131	10,397	12,553	13,811	13,837	7,370
OATS:										
Canada	...	4,674	4,235	4,456	7,188	...	14,607	13,234	13,925	22,446
United States (2)	...	6,113	7,343	5,365	3,905	...	19,103	22,947	16,765	12,204
TOTAL	8,564	10,787	11,578	9,821	11,088	26,763	33,710	36,181	30,690	34,650
BARLEY:										
Canada	...	12,962	13,938	11,750	8,940	...	27,004	29,037	24,497	18,625
United States (2)	...	3,793	4,600	3,125	3,288	...	7,640	9,583	6,511	6,849
TOTAL	...	16,725	18,538	14,884	12,228	...	34,644	38,620	31,008	25,474
MAIZE:										
United States (2)	11,019	12,319	11,262	12,013	17,355	10,676	21,908	20,110	21,452	30,901

Authority: Bradstreet's (for rye: Grain, Seed and Oil Reporter).

(1) Grain stored at principal interior and seaboard points of accumulation and grain in transit by canals and lakes. — (2) East of Rocky Mountains.

GRAIN AND FLOUR STOCKS AT THE PORTS OF GREAT BRITAIN AND IRELAND (1).

PRODUCTS	1-V-31	1-IV-31	1-III-31	1-V-30	1-V-29	1-V-31	1-IV-31	1-III-31	1-V-30	1-V-29
	1000 centals					1000 bushels				
WHEAT:										
Grain	5,400	6,960	6,912	4,944	5,136	0,000	11,600	11,520	8,240	8,560
Flour as grain	552	576	864	1,008	624	920	960	1,440	1,080	1,040
TOTAL	5,952	7,536	7,776	5,952	5,760	920	12,560	12,960	9,320	9,600
Maize	1,560	1,728	2,448	1,200	2,784	2,786	3,088	4,371	2,000	4,071
Barley	840	1,100	1,360	1,200	1,280	1,750	2,292	2,833	2,500	2,625
Oats	608	1,024	1,104	512	608	1,900	3,200	3,450	1,600	1,900

Authority: Broomhall's Corn Trade News.

(1) Imported cereals.

STOCKS OF COTTON ON HAND IN THE UNITED STATES.

LOCATION	30-IV-31	31-III-31	28-II-31	30-IV-30	30-IV-29	30-IV-31	31-III-31	28-II-31	30-IV-30	30-IV-29
	1000 centals					1000 bales (counting round as half bales)				
In consuming establishments	6,555	7,072	7,407	8,118	7,777	1,370	1,478	1,548	1,667	1,607
In public storage and at compresses . .	28,873	31,787	35,045	17,722	12,220	6,034	6,643	7,324	3,686	2,524
TOTAL . . .	35,428	38,859	42,452	25,840	19,997	7,404	8,121	8,872	5,353	4,131

STOCKS OF COTTON AT BOMBAY AND AT ALEXANDRIA.

PORTS	30-IV-31	2-IV-31	26-II-31	1-V-30	2-V-29	30-IV-31	2-IV-31	26-II-31	1-V-30	2-V-29
	1000 centals					1000 bales (1 bale = 478 lbs.)				
Bombay (1)	4,024	3,693	3,815	5,228	5,218	842	773	748	1,094	1,091
Alexandria	4,955	(2) 5,061	5,163	3,847	2,895	1,037	(2) 1,063	1,078	805	606

Authorities: *East Indian Cotton Ass.* and *Alexandria General Produce Ass.*

(1) Stocks held by exporters, dealers and mills. — (2) April, 1st, 1931.

STOCKS OF COTTON IN EUROPE.

COUNTRIES, PORTS, DESCRIPTIONS	30-IV-31	2-IV-31	26-II-31	1-V-30	2-V-29	30-IV-31	2-IV-31	26-II-31	1-V-30	2-V-29
	1000 centals					1000 bales (1 bale = 478 lbs.)				
<i>Great Britain</i> (1):										
American	2,508	2,503	2,780	2,015	3,472	525	543	581	422	726
Argentine, Brazilian, etc. . . .	208	212	204	594	142	44	44	43	124	30
Peruvian, etc. . . .	236	286	344	260	152	49	60	72	54	32
East Indian, etc. .	844	864	488	319	226	176	181	102	67	47
Egyptian, Sudanese	1,366	1,479	1,486	982	1,107	292	309	311	205	232
Other (2)	237	241	234	389	287	60	50	44	61	60
TOTAL . . .	5,429	5,675	5,536	4,459	5,386	1,136	1,187	1,168	933	1,127
<i>Bremen</i> :										
American	2,427	2,506	2,458	2,147	2,208	508	524	514	449	462
Other	48	36	58	47	13	10	8	12	10	3
TOTAL . . .	2,475	2,542	2,516	2,194	2,221	518	532	526	459	465
<i>Le Havre</i> :										
American	1,666	1,691	1,591	1,198	1,057	348	354	333	251	221
Other	180	155	164	157	79	84	33	34	33	17
TOTAL . . .	1,826	1,846	1,755	1,355	1,136	382	387	367	284	238
<i>Total Continent</i> (3):										
American	4,661	4,808	4,665	3,835	3,642	931	1,006	976	802	762
Argentine, Brazilian, etc. . . .	100	90	121	67	42	21	19	25	14	9
E. Indian, Australian, etc. . . .	244	219	195	223	142	51	46	41	47	30
Egyptian	109	102	104	98	101	23	21	22	20	12
W. Indian, W. African, E. African, etc. . . .	52	52	76	81	77	11	11	16	17	10
TOTAL . . .	5,196	5,271	5,161	4,305	3,932	1,087	1,108	1,080	900	823

Authority: *Liverpool Cotton Ass.*

(1) Data for following day. — (2) Includes: W. Indian, etc.; E. African, etc.; W. African, and Australian. — (3) Includes Bremen, Havre, and other Continental ports.

MONTHLY REVIEW OF PRICES (1)

PRODUCTS, MARKETS AND DESCRIPTIONS	May 15, 1931	May 8, 1931	May 1, 1931	April 24, 1931	Average (2)			Commercial Season	
					April 1931	May 1930	May 1929	1929-30	1928-29
WHEAT.									
Winnipeg: No. 1 Manitoba (cents p. 60 lbs.) . .	62	61 1/4	60 3/4	59 1/4	59	108 1/4	113	124 1/4	124
Chicago: No. 2 Hard Winter (3) (cents p. 60 lbs.)	83 1/4	83 1/4	82 1/4	82 1/4	82 1/4	108 1/4	110	114 1/4	119 1/4
Minneapolis: No. 1 Northern (cents p. 60 lbs.) .	81 1/4	81 1/4	80 1/4	79 1/4	79 1/4	103 1/4	104 1/4	117 1/4	115 1/4
New York: No. 2 Hard Winter (3) (cents p. 60 lbs.)	n. q.	n. q.	n. q.	n. q.	n. q.	110 1/2	116 1/4	121 1/4	131 1/4
Buenos Aires (a); Barletta (80 kg. p. hectol. — pesos paper per quintal)	6.15	6.15	5.90	5.80	5.60	10.44	9.01	10.65	9.08
Karachi: Karachi white, 2 1/2 % barley, 1 1/2 % dirt (rupees per 656 lbs.)	19-1-0	19-5-0	18-5-0	18-7-0	18-15-0	32-13-0	30-6-4	36-6-9	43-13-7
Berlin: Home grown (Reichsmarks p. quintal) . .	28.60	29.75	28.20	28.80	28.80	28.07	21.66	25.33	21.83
Hamburg, c. i. f. (Reichsmarks p. quintal):									
No. 3 Manitoba	11.74	(5) 12.33	(6) 11.91	(7) 11.88	(5) 12.05	18.60	19.75	21.30	21.59
No. 2 Hardwinter	n. q.	n. q.	(6) n. q.	n. q.	n. q.	17.91	18.05	19.49	20.98
Barusso (79 kg. p. hectol.)	9.88	10.15	(6) 10.22	9.97	9.77	(8) 17.30	17.82	18.72	19.96
Antwerp (Belgian francs p. quintal):									
Home grown . . . . .	...	104	104	104	(9) 92 1/4	151	165 1/4	154 1/4	162 1/4
No. 2 Hard Winter, Gulf . . . . .	...	(10) 105	(10) 102	(10) 105	(11) 107	156 1/4	n. 170	171	...
Paris: Home grown, 75-77 kg. (francs p. quintal) .	185.00	188.00	185.00	181.50	185.95	127.70	154.05	180.40	155.35
London: Home grown (shillings per 504 lbs.) . .	25/6	25/6	24/6	22/-	22/-	38/9	43/5	40/10	43/6
London and Liverpool c. i. f., shipping current month (shillings p. 480 lbs.):									
South Russian (on sample)	n. q.	21/9	n. q.	21/-	21/10	n. q.	n. q.	n. q.	n. q.
No. 3 Manitoba	(12) 24/3	(12) 24/1 1/2	(12) 24/-	(12) 24/-	12/23/2	39/8	41/3	45/2	45/6
No. 2 Hard Winter (3)	23/8	n. q.	n. q.	n. q.	n. q.	38/2	38/11	41/5	43/3
White Pacific	25/-	n. 25/3	24/6	25/-	25/-	38/10	41/10	42/3	46/-
Rosafe (63 1/2 lbs.), afloat	(13) 21/6	(13) 21/9	(13) 21/6	(13) 21/6	13/20/9	(14) 38/2	38/3	40/3	42/3
Choice White Karachi	23/8	25/-	25/-	n. q.	n. q.	39/10	n. q.	42/2	n. q.
Australian	24/-	24/-	23/3	22/6	21/10	40/8	42/1	43/6	45/11
Milan (b): Home grown, soft (liras p. quintal) .	114.00	114.00	112.00	109.50	106.50	137.10	132.90	131.80	131.40
Genoa c. i. f. (shillings p. metric ton): La Plata .	...	n. 110/-	105/-	112/-	13/102/1	174/3	179/1	184/6	192/10
RYE.									
Minneapolis: No. 2 (cents per 56 lbs.)	38 1/2	36 1/2	33 1/2	35	35	66 1/4	88 1/4	80 1/4	99
Berlin: Home grown (Reichsmarks per quintal) .	19.55	19.40	19.80	19.70	19.10	16.88	19.38	17.04	20.47
Hamburg c. i. f.: La Plata, 74-75 kg. (R. M. p. 100 kg.)	n. q.	n. q.	(6) n. q.	n. q.	n. q.	(16) 10.88	17.69	14.57	19.72
Groningen (c): Home grown (florins per quintal) .	4.85	4.85	4.80	4.62	4.20	4.92	10.03	6.33	9.74
BARLEY.									
Winnipeg: No. 4 Western (cents p. 48 lbs.) . .	30 1/4	29 1/4	27 1/4	28	25 1/4	41 1/4	68	51 1/4	67 1/4
Chicago: Feeding (cents per 48 lbs.)	42	39	38	42	43 1/4	53 1/4	53 1/4	57 1/4	56 1/4
Berlin: Home grown, fodder (Reichsmarks per quintal)	23.70	23.70	23.70	23.70	22.79	17.75	18.98	17.40	19.78
Antwerp: Danube (francs per quintal) . . . .	...	83	85	83	(17) 78	83 1/2	151	107 1/2	154 1/2
London: English malting (shillings p. 448 pounds).	32/6	32/6	32/6	32/6	33/4	33/4	42/4	39/-	47/8
London and Liverpool, c. i. f., parcels (shillings per 400 lbs.):									
Danubian 3 %	18/3	18/3	17/6	17/9	16/4	17/4	32/5	22/3	32/6
Russian (Azooff-Black sea)	n. q.	n. q.	n. q.	n. q.	n. q.	17/1	n. q.	18/11	n. q.
Canadian Western, No. 4	(18) 17/-	(18) 17/-	(18) 16/4 1/2	(18) 17/-	(18) 15/9	20/10	28/3	n. 25/10	29/4
Californian malting (shillings p. 448 lbs.) . .	31/6	31/6	31/6	32/-	27/6	29/11	42/5	32/6	30/9
Moroccan	n. q.	n. q.	n. q.	n. q.	n. q.	n. q.	27/5	n. 24/2	29/8
Groningen (e): Home grown winter (fl. p. quintal)	5.50	5.50	5.50	5.50	5.10	6.81	10.19	7.55	9.97

(a) Thursday prices. — (b) Saturday prices. — (c) Prices of preceding Tuesday.

(1) All quotations are, unless otherwise stated, for spots. — (2) The monthly averages are based on Friday quotations, the annual averages on the monthly. — (3) Quoted formerly as No. 2 Winter. — (4) March, 20: 19-6-0; average March: 19-7-8. — (5) No. 2, Manitoba. — (6) May, 2. — (7) No. 2, Manitoba: 12.33. — (8) 78 kg. per hectolitre. — (9) April, 17: 95. — (10) No. 2, Hard Winter, Atlantic. — (11) April, 17: No. 2, Hard Winter, Atlantic: 101. — (12) Shipping May from Vancouver. — (13) 63 lbs. per bushel. — (14) 62 1/2 lbs. per bushel. — (15) April, 17: 103/-. — (16) 73 kg. per hectolitre. — (17) April, 17: 77. — (18) No. 3 Western.

PRODUCTS, MARKETS AND DESCRIPTION	May 15, 1931	May 8, 1931	May 1, 1931	April 24, 1931	Average (1)					
	April 1931	May 1930	May 1929	Commercial Season	1929-30	1928-29				
OATS.										
Winnipeg: No. 2 White (cents per 34 lbs.) . . .	20 7/8	20 1/8	28 1/8	20 3/8	28	50 1/8	50	58 1/2	58 7/8	
Chicago: No. 2 White (cents per 32 lbs.) . . .	29 3/8	29 3/8	28 3/8	29 7/8	30 3/8	42 1/8	46 3/8	44 1/8	47 1/8	
Buenos Aires (a): Current quality (pesos paper per quintal)	4.10	4.10	3.85	4.00	3.44	4.30	6.83	5.30	7.71	
Berlin: Home grown (Reichsmarks per quintal) .	19.80	19.90	18.95	18.80	17.70	15.77	19.25	15.62	19.08	
Paris: Home grown, black and other (francs per quintal)	91.75	95.75	95.50	94.25	89.40	65.85	181.20	81.15	127.85	
London: Home grown white (shillings per 336 lbs.)	21/6	19/6	19/6	18/6	17/10	19/6	29/9	21/-	28/3	
London and Liverpool c. i. f., parcels (shillings p. 320 lbs.):										
Danubian (39-40 lbs.)	n. q.	n. q.	n. q.	n. q.	n. q.	14/2	n. q.	(2)n. 16/4	n. q.	
Plate (f. a. q.)	12/3	12/3	11/4 1/2	12/-	10/7	12/6	21/11	16/1	23/9	
White clipped American	n. q.	n. q.	n. q.	n. q.	n. q.	22/9	n. q.	n. q.	24/2	
Chilian Tawny	12/7 1/2	(3)12/-	(3)12/1 1/2	12/7 1/2	11/7	13/5	22/2	17/3	24/2	
Milan (b): spot (liras per quintal):										
Home grown	72.50	73.50	73.50	73.50	73.50	74.60	96.70	80.75	103.30	
Foreign imported	62.50	63.50	63.50	61.00	57.50	66.30	92.00	74.25	98.90	
MAIZE.										
Braila: Danube (lei per quintal) . . . . .	...	251	255	242	234	285	795	309	687	
Chicago: No. 2 Mixed American (cents per 56 lbs.)	55	57 1/8	56 1/2	57 1/2	59 1/2	80 3/8	84	85 1/8	94 1/8	
Buenos Aires (a): Yellow Plate (pesos paper per quintal)	3.95	3.80	3.75	3.40	3.51	6.00	7.42	6.17	8.35	
Antwerp, spot (Belgian francs per quintal):										
Bessarabian . . . . .	...	86	85	84	(5)80 1/2	n. 99	n. q.	n. 97 1/4	n. q.	
Cinquantino . . . . .	...	(3)92	(3)96	(3)92	(6)91 1/8	132 3/4	167	131 1/4	173	
Yellow Plate . . . . .	...	(3)88	(3)83 1/2	(3)83	(7)79 1/4	115	151	109 1/4	155 1/4	
London and Liverpool, parcels, c. i. f. (shillings per 480 lbs.):										
Danube	n. q.	n. q.	(8)10/-	(8)20/-	(8)19/2	23/1	n. q.	24/11	n. q.	
Yellow Plate	16/4 1/2	16/-	17/-	17/8	18/3	24/10	34/5	25/3	38/3	
No. 2 White African	(9)20/6	(9)19/6	(9)19/6	(9)18/9	(9)18/10	25/5	n. q.	26/-	38/8	
Milan (b): Home grown (liras per quintal) . . .	54.50	51.50	51.50	51.50	51.00	67.00	90.20	71.35	97.90	
RICE (CLEANED).										
								1930	1929	
Milan (b): Maratelli (lire per quintal)	130.00	130.00	127.00	122.00	118.50	157.00	202.70	152.15	146.70	
Rangoon: No. 2 Burma (rupees per 7500 lbs.) .	215	210	215	225	235	446	450	393 1/4	462 1/8	
Saigon (Indochinese piastres (10) p. quintal):										
No. 1 Round white (25 % broken)	5.93	5.85	6.10	6.26	6.30	12.01	10.69	11.36	11.58	
No. 2 Japan (40 % broken)	5.44	5.27	5.52	5.66	5.65	12.37	10.21	10.89	11.08	
London (a): c. i. f. (shillings per 112 lbs.):										
Spanish Belloch, No. 3 oiled	12/1 1/2	12/1 1/2	11/10 1/2	12/1 1/2	12/3	14/3	17/5	14/1	17/11	
Italian good, No. 6 oiled	15/6	15/6	15/-	15/-	18/11	14/9	19/3	14/11	18/9	
American Blue Rose	18/3	18/1 1/2	17/9	18/1 1/2	17/9	23/11	21/2	21/9	21/10	
Burma, No. 2	7/-	6/10 1/2	7/-4	7/4	7/5	12/1	12/10	10/11	13/2	
Saigon, No. 1	7/-	7/-	7/3	7/3	7/4	12/6	12/11	11/6	13/3	
Siam, Garden, No. 1	8/6	8/7 1/2	9/-	8/9	9/1	15/9	15/-	14/-	15/1	
Tokio: Various qualities (yens per koku)	18.30	18.30	18.10	18.10	18.22	27.28	29.32	25.57	29.06	
LENSSEED.										
Buenos Aires (a): Current quality (pesos paper per quintal)	10.70	10.70	10.45	10.50	10.34	19.38	15.38	17.19	18.20	
Antwerp: Plate (Belgian francs p. quintal) . . .	...	150	151	147	(11)153	312	277 1/4	284 1/4	318 1/4	
Hull, c. i. f.: Plate (p. sterling p. l. ton)	8-8-0	8-11-3	8-12-6	8-12-6	8-16-10	17-9-0	15-13-9	15-0-5	18-5-0	
London, c. i. f.: Bombay bold (p. st. per long ton).	11-7-6	11-7-6	11-12-6	12-0-0	n. q.	10-11-0	18-11-3	17-14-4	20-16-1	
Duluth: No. 1, Northern (cents p. 56 lbs.) . . .	152 1/2	155 1/4	159	156 1/2	155 1/8	268 1/2	242	236	273 1/8	

(a) Thursday prices. — (b) Saturday prices.

(1) The monthly averages are based on Friday quotations, the annual averages on the monthly. — (2) Weight not indicated. — (3) New harvest. — (4) April, 17: 245. — (5) April, 17: 80 (New harvest). — (6) April, 17: 90 (New harvest). — (7) April, 17: 80. (New harvest). — (8) Maize Galatz-Fox. — (9) White East African. — (10) Actual rate of change: 1 piastre = 38 3/4, fr. — (11) April 17: 153. — (12) April, 17: 8-18-9.

PRODUCTS, MARKETS AND DESCRIPTION	May 15, 1931	May 8, 1931	May 1, 1931	April 24, 1931	Average (1)				Commercial Season	
					April 1931	May 1930	May 1929		1929-30	1928-29
COTTONSEED.										
Alexandria : Sakellaridis (piastres per ardeb) . . .	50.6	51.6	53.0	55.8	57.7	64.3	86.2		67.9	95.4
Hull : Sakellaridis (p. sterl. per long ton) . . .	5-10-0	5-8-0	5-13-9	6-0-0	6-2-6	6-16-9	8-12-3		6-18-2	9-12-2
COTTON.										
New Orleans : Middling (cents per lb.)	9.20	9.70	9.25	9.89	9.90	15.64	18.69		16.17	18.98
New York : Middling (cents per lb.)	9.50	10.00	9.50	10.15	10.25	16.47	19.39		16.60	19.09
Bombay : M. g. Broach f. g. (rupees per 784 lbs.) .	177	182	179	187	193 ½	251 ¼	332 ¾		283 ½	346 ¼
Alexandria (a) (talaris per kantar) :										
Sakellaridis f. g. f.	15.22	15.22	14.07	15.62	15.78	27 ½	33 ¾		28 ½	35 ¼
Ashmouni (Upper Egypt) f. g. f.	11.00	11.25	11.25	11.60	11.65	19 7/16	21 7/16		19 ½	22 7/16
Bremen : Middling (U. S. cents per lb.)	10.65	10.88	10.99	11.34	11.35	17.46	20.41		18.27	21.19
M. g. Broach fully good (pence per lb.)	n. 4.40	n. 4.40	n. 4.40	n. 4.65	n. 4.84	n. 5.90	n. 7.77	n.	6.83	8.27
Le Havre : Middling, Gulf (francs per 50 kilogr.) .	325	331	339	349	(2) 352	507	611		545	624
Liverpool (pence per lb.) :										
Middling fair	n. 6.46	n. 6.50	n. 6.66	n. 6.82	n. 6.83	n. 9.92	n. 11.42	n.	10.30	n. 11.09
Middling	5.28	5.39	5.46	5.62	5.63	8.61	10.19		9.09	10.53
Sao Paulo, good fair	5.46	5.59	5.66	5.82	5.83	8.40	10.57		9.02	n. 10.91
M. g. Broach, fully good	n. 4.08	n. 4.21	n. 4.18	n. 4.33	n. 4.31	n. 6.00	n. 8.31	n.	6.80	n. 8.08
Sakellaridis, fully good fair	8.30	8.80	8.20	8.30	8.75	13.99	17.65		14.52	18.17
BUTTER.										
									1930	1929
Copenhagen (a) (Kr. p. 100 kg.)	190	190	195	200	(3) 201	217	275		245	308
Maastricht, auction (b) : Dutch (florins p. 50 kg.)	1.32	1.28	1.29	1.38	(4) 1.43	1.50	1.91		1.70	2.09
Hamburg, auction (b) : Schleswig-Holstein butter, with quality mark (R. M. per 50 kg.)	124.76	124.12	127.46	127.32	128.57	127.40	163.81		146.67	178.03
Kempten (b) : Allgäu butter (Pfennige p. half kg.)	100	100	109	109	110	118	152		128	159
London (c) (shillings p. cwt.) :										
British blended	140/-	140/-	144/8	144/8	144/8	154/-	186/8		158/8	196/-
Danish	120/-	122/-	120/-	126/-	128/6	138/-	170/5		153/6	186/6
Irish creamery, salted	n. q.	n. q.	n. q.	n. q.	n. q.	137/-	171/2		134/10	179/4
Dutch	118/-	120/-	120/-	126/-	128/6	138/10	165/2		151/11	182/4
Argentine	113/-	115/-	115/-	115/-	117/9	134/10	166/10		136/10	174/1
Siberian	n. q.	n. q.	n. q.	n. q.	n. q.	127/2	161/2	n.	133/10	167/2
Australian, salted	110/-	112/-	113/-	113/-	115/9	135/9	172/-		135/9	170/-
New Zealand, salted	112/-	114/-	114/-	114/-	117/3	138/5	170/10		137/8	178/9
CHEESE.										
Milan (lire per quintal) :										
Parmigiano-Reggiano, 1st quality of last year's production . . . . .	...	1,112	1,112	1,112	1,112	1,177	1,050		1,160	1,074
Green Gorgonzola, mature, choice . . . . .	...	635	635	635	645	650	850		671	829
Rome : Roman pecorino (lire p. quintal)	1,125	1,125	1,125	1,125	1,094	1,225	1,675		1,207	1,546
Alkmaar : Edam 40 + 40% butterfat, with the country's cheesemark, factory cheese, small: florins, p. 50 kg.) . . . . .	...	32.50	30.50	30.50	(5) 32.62	30.00	42.30		40.83	47.10
Gouda (6) : Gouda 45 + (whole milk cheese, with the country's cheesemark, home made; florins, p. 50 kg.) . . . . .	...	37.50	37.50	36.00	(7) 35.50	41.40	42.30		45.56	52.46
Kempten (b) : (Pfennige per half kg.) :										
Soft cheese, green (20 % butterfat)	21 ½	19 ½	19 ½	19 ½	21	23	36		27	35
Emmenthal from the Allgäu (whole milk cheese) 1st quality	98 ½	98 ½	98 ½	98 ½	98 ½	(8) 100	(8) 113	(8)	97	(8) 107
London (c) (shillings per cwt.) :										
English Cheddar	106/-	106/-	106/-	106/-	106/-	123/2	137/7		103/4	121/9
Canadian	79/-	78/6	78/6	79/-	80/-	105/7	112/10		93/11	107/8
New Zealand	51/6	53/6	55/6	55/6	57/-	87/5	91/8		82/2	95/5
Liverpool (c) : Engl. Cheshire, ungraded (sh. p. cwt.)	(9) 77/-	81/8	86/4	95/8	103/10	81/2	85/10		90/5	111/9

(a) Thursday prices. — (b) Wednesday prices. — (c) Average prices for weeks ending on preceding Wednesday.

(1) The monthly averages are based on Friday quotations, the annual averages on the monthly. — (2) April, 17 : 347. — (3) April, 16 : 300. — (4) April, 15 : 1.41. — (5) April, 17 : 32.00 ; April, 10 : 33.50 ; April, 3 : 34.50 ; average March : 36.62 ; average February : 35.87 ; average January : 34.50 ; average December : 35.87. — (6) Indicated formerly as : Bodegraven. — (7) April, 17 : 34.50. — (8) Average prices for all qualities.

THE PRICES OF AGRICULTURAL PRODUCTS

IN APRIL, 1931

In the following pages the index-numbers of prices of agricultural products and other price indices of interest to the farmer are given as published in the different countries. The indices collected together have been obtained according to different methods and criteria in the various countries. A detailed account of the items included in each series and the system of construction of the index-numbers may be found in the volume published especially for this purpose by the Institute, entitled « Index-numbers of prices of agricultural products and other price indices of interest to the farmer ». We refer the reader to this volume for an exact interpretation of the significance of the different series of data.

Owing to the substantial divergence which often exists in the value and significance of the indices available, much care is advisable in their utilization from an international point of view. For this reason it has been considered opportune to reproduce all the data in their original form only, without attempting to formally unite them. The latter process, by a comparison of often heterogeneous data, might easily lead to the drawing of erroneous relations and conclusions.

But in addition to the original data, and subject to the above comments, a summary table is given below.

Countries	Percentage variations in the index-numbers for April, 1931			
	compared with those for March, 1931		compared with those for April, 1930	
	Index-numbers ^a of prices of agricultural products	General index-numbers of prices	Index-numbers of prices of agricultural products	General index-numbers of prices
Germany	+ 1.5	— 0.2	— 3.4	— 10.3
England and Wales	0.0	— 1.3	— 10.2	— 16.8
Argentina	— 2.8	—	— 34.1	—
Canada	+ 2.0	— 0.8	— 34.7	— 18.6
Estonia	0.0	—	— 13.3	—
United States ^{a)}	0.0	—	— 28.3	—
Finland ^{b)}	— 0.7	— 1.6	— 26.6	— 19.2
Hungary . . . . .	...	...	...	...
Italy	0.0	— 1.1	+ 1.2	— 3.1
New Zealand	+ 3.0	— 0.9	— 16.5	— 17.7
Netherlands	— 5.4	—	— 27.3	—
Poland	+ 2.7	— 1.1	— 7.4	— 16.9
Yugoslavia . . . . .	...	...	...	...
	^{c)} + 5.9	+ 0.9	^{c)} — 18.6	— 15.7
	^{d)} — 2.6		^{d)} — 24.0	

a) "Bureau of Agricultural Economics". — b) "Bureau of Labor". — c) Products of the soil. — d) Animal products.

INDEX-NUMBERS OF PRICES OF AGRICULTURAL PRODUCTS AND OF COMMODITIES BOUGHT BY THE FARMER *

COUNTRIES AND CLASSIFICATION	April	March	Febr.	Jan.	Dec.	Nov.	April	April	Year	
	1931	1931	1931	1931	1930	1930	1930	1929	1930 (1)	
									1930 (1)	1929
GERMANY (Statistisches Reichsamt) 1913 = 100.										
Foodstuffs of vegetable origin	129.7	121.0	114.1	111.6	111.3	110.9	117.6	130.0	115.3	126.3
Livestock	83.3	88.7	90.6	97.5	104.4	108.2	113.3	122.2	112.4	126.6
Livestock products	105.7	113.0	118.9	119.4	126.6	131.3	110.2	126.6	121.7	142.1
Feeding stuffs	118.9	102.7	93.0	90.9	91.1	87.9	99.2	140.2	98.2	125.9
Total agricultural products	108.3	106.7	105.9	106.7	110.4	112.0	112.1	128.2	113.1	130.2
Fertilizers	80.1	82.7	83.1	82.3	90.5	80.4	86.1	87.5	82.4	84.5
Agricultural dead stock	131.2	132.4	133.3	134.9	136.0	137.4	140.2	141.5	139.4	141.3
General index-number	113.7	113.9	114.0	115.2	117.8	120.1	126.7	137.1	124.6	137.2
ENGLAND AND WALES (Ministry of Agriculture) Average of corresponding months 1911-13 = 100.										
Agricultural products	123	123	126	130	126	129	137	146	134	144
Feeding stuffs	88	85	77	78	81	78	106	145	96	139
Fertilizers	100	100	100	102	101	100	102	102	101	100
General index-number (2).	99.3	100.6	100.6	100.8	102.2	104.2	119.4	137.1	113.1	135.3
ARGENTINA (Banco de la Nación argentina) 1926 = 100.										
Cereals and linseed	51.2	53.2	54.5	53.6	56.0	59.8	93.2	95.6	82.3	100.4
Meat	93.7	94.2	94.6	91.0	90.5	99.3	113.1	111.9	110.9	113.6
Hides and skins	70.5	70.1	70.0	69.1	65.6	70.4	70.6	100.6	71.6	95.0
Wool	57.7	64.5	55.2	50.6	51.8	57.3	67.1	109.9	67.4	108.5
Dairy products	73.6	74.3	72.9	68.7	68.7	72.6	85.0	106.1	82.4	105.9
Forest products	108.7	108.7	108.7	108.7	108.7	108.7	106.8	113.1	107.9	111.5
Total agricultural products	61.4	63.2	63.4	61.7	63.2	67.9	93.0	100.2	85.5	102.6
CANADA (Internal Trade Branch of the Dominion Bureau of Statistics) 1926 = 100.										
Field products (grain, etc.)	47.3	44.1	45.0	42.6	48.6	48.7	82.2	86.4	70.4	93.8
Animals and animal products	82.5	84.7	87.5	92.1	93.1	96.6	110.4	111.5	103.1	112.5
Total Canadian farm products	60.5	59.3	60.9	61.1	62.3	66.6	92.7	95.8	82.7	100.8
Fertilizers	86.5	86.5	89.4	83.9	83.2	89.3	83.9	96.3	83.6	92.6
General index-number	74.5	75.1	76.0	76.7	77.8	79.8	91.7	94.5	86.9	95.6
ESTONIA (Central Bureau of Statistics) 1922 = 100.										
Commodities imported	90	81	83	86	83	88	70	99.9	83	94.6
Commodities exported	63	68	66	64	68	72	85	109.1	88	112.8
Agricultural products imported and exported	72	72	72	71	70	74	83	105.8	84	105.7

* For an explanation of the method of calculation of the index-numbers, reference should be made to the Institute's publication "Index-numbers of Prices of Agricultural Products and other Price-indices of interest to the Farmer" (Rome, 1930).

(1) Most data for 1930 are provisional. — (2) Calculated by the "Statist", reduced to base-year 1913 = 100.

COUNTRIES AND CLASSIFICATION	April	March	Febr.	Jan.	Dec.	Nov.	April	April	Year	
	1931	1931	1931	1931	1930	1930	1930	1929	1930 (x)	1929
UNITED STATES (Bureau of Agricultural Economics) Average 1909-10 to 1913-14 = 100.										
Cereals	74	74	75	77	80	80	110	120	100	121
Fruits and vegetables	120	109	109	108	108	114	187	110	158	136
Meat animals	106	106	106	112	112	118	146	164	134	166
Dairy products	99	101	101	107	117	124	126	142	123	140
Poultry and poultry products	90	92	79	110	127	146	117	127	126	159
Cotton and cottonseed	78	80	76	72	78	80	120	152	102	145
Total agricultural products	91	91	90	94	97	103	127	138	117	138
Commodities purchased by farmers (2)	134	136	139	149	149	149	153	155	151	155
Agricultural wages (2)	—	127	—	—	129	—	102	167	...	170
UNITED STATES (Bureau of Labor) 1926 = 100.										
Grains	59.5	59.3	60.4	62.4	64.0	64.0	84.1	94.3	78.6	97.4
Livestock and poultry	70.3	70.7	69.6	75.2	76.3	77.7	96.9	114.7	89.2	106.1
Other farm products	73.4	74.2	73.7	76.0	78.1	85.4	99.0	101.8	91.3	106.6
Total farm products	70.1	70.6	70.1	73.5	75.2	79.3	95.8	104.9	88.5	104.9
Agricultural implements	94.7	94.7	94.7	94.7	94.9	94.9	95.0	98.8	95.1	97.9
Fertilizer materials	80.6	80.8	81.1	81.4	81.4	82.1	88.1	94.6	85.4	92.1
Mixed fertilizers	83.5	88.3	89.1	90.4	90.6	91.1	94.4	96.2	93.6	97.2
Cattle feed	81.2	82.1	71.6	75.0	78.2	83.0	117.1	108.0	99.8	121.6
Non-agricultural commodities	74.3	75.7	77.1	78.2	79.4	80.9	89.4	94.7	85.9	94.4
General index-number	78.3	74.5	75.5	77.0	78.4	80.4	90.7	96.8	86.4	90.5
FINLAND (Central Bureau of Statistics) 1926 = 100.										
Cereals . . . . .	...	74	74	75	72	71	83	107	76	98
Potatoes . . . . .	...	73	68	68	59	51	89	203	76	148
Fodder . . . . .	...	70	62	59	58	58	63	68	62	69
Meat . . . . .	...	73	73	74	72	70	95	103	88	103
Dairy products . . . . .	...	74	75	73	74	79	91	98	84	103
Total agricultural products . . . . .	...	75	74	74	73	74	85	104	82	100
General index-number . . . . .	...	86	86	80	86	87	92	99	90	98
HUNGARY (Central Bureau of Statistics) 1913 = 100.										
Agricultural and livestock products	84	84	80	79	78	80	83	134	—	—
General index-number	93	94	92	91	90	92	96	135	—	—
ITALY (Consiglio Provinciale dell'Economia di Milano) 1913 = 100.										
National agricultural products	356.36	345.90	343.75	347.90	356.88	373.77	426.89	532.18	413.89	508.76
General index-number	353.10	356.18	357.02	361.86	368.63	379.03	420.24	492.64	411.04	480.69
NEW ZEALAND (Census and Statistics Office) Average 1909-13 = 100.										
Dairy produce	89.4	93.1	102.0	98.8	102.6	104.8	117.7	141.8	120.0	145.7
Meat	128.1	125.4	142.4	147.0	160.0	146.6	170.2	179.9	161.6	170.9
Wool	76.6	60.3	55.7	62.3	59.3	79.8	88.5	162.2	95.7	188.6
Hides, skins, and tallow	84.0	78.4	96.0	93.2	122.6	98.9	155.5	215.4	142.1	173.9
Miscellaneous	134.1	114.0	122.9	118.8	129.8	128.0	199.8	130.2	129.0	146.7
Total agricultural products	90.0	95.1	97.2	96.7	101.3	107.4	128.8	164.0	124.8	161.5

(1) Most data for 1930 are provisional. — (2) 1910-14 = 100. — (3) January.

COUNTRIES AND CLASSIFICATION	April	March	Feb.	January	Dec.	Nov.	April	April	Year	
	1931	1931	1931	1931	1930	1930	1930	1929	1930 (1)	1929
NORWAY (Kgl. Selskap for Norges Vel.) Average 1909-14 = 100.										
Cereals	105	104	104	102	99	101	128	104	(2) 108	(2) 155
Potatoes	167	181	181	180	158	155	113	127	(2) 152	(2) 120
Port	74	81	84	81	98	102	123	138	(2) 106	(2) 141
Other meal	162	172	182	184	193	192	204	191	(2) 108	(2) 190
Eggs	85	124	101	107	146	179	106	111	(2) 121	(2) 135
Dairy products	133	135	138	130	150	158	149	149	(2) 150	(2) 161
Concentrated feeding stuffs	111	108	103	107	111	115	129	164	(2) 117	(2) 148
Maize	85	83	81	89	93	97	120	172	(2) 103	(2) 148
Fertilizers	90	96	96	96	95	101	105	101	(2) 101	(2) 108
NETHERLANDS (Directie van den Landbouw) Average 1924-25 to 1928-29 = 100.										
Products of the soil	78	71	66	62	59	61	58	76	(3) 68	(3) 87
Animal products	74	74	74	74	74	77	80	98	(3) 95	(3) 98
Total agricultural products	75	73	72	71	71	73	81	92	(3) 88	(3) 95
Agricultural wages	95	100	100	100	100	100	100	100	(3) 100	(3) 100
General index-number (4)	60.0	60.7	70.4	71.0	72.4	74.4	82.5	97.4	79.2	90.1
POLAND (Central Bureau of Statistics) 1927 = 100.										
Products of the soil . . . . .	...	...	45.8	44.3	46.4	47.6	55.8	85.9	52.2	73.1
Products of agricultural industry . . . . .	...	...	58.3	59.3	63.6	65.4	75.4	87.2	60.9	80.9
Total products of plant origin . . . . .	...	57.1	52.6	51.5	54.6	56.1	65.0	86.6	60.6	76.9
Animals . . . . .	...	...	58.9	54.9	68.6	72.7	90.8	98.7	82.3	98.4
Dairy products . . . . .	...	...	80.1	81.1	91.9	97.0	71.1	12.5	81.3	102.9
Total products of animal origin . . . . .	...	64.8	67.7	66.2	78.2	84.0	81.5	96.0	81.9	100.2
Total agricultural products . . . . .	...	50.8	58.2	56.9	63.2	66.2	71.3	90.3	68.5	85.7
Fertilizers . . . . .	...	124.7	124.7	124.7	124.7	124.7	105.0	118.2	121.7	126.5
Industrial products . . . . .	...	83.9	84.4	84.1	86.9	88.0	96.5	104.3	94.2	103.8
General index-number . . . . .	...	72.4	72.4	71.6	70.2	78.6	85.0	98.3	82.4	95.7
YUGOSLAVIA (National Bank of the Kingdom of Yugoslavia) 1926 = 100.										
Products of the soil	77.6	78.3	73.5	71.7	72.5	71.4	95.3	135.7	89.3	118.6
Animal products	75.4	77.4	78.1	82.0	80.4	95.1	90.2	110.2	90.3	107.2
Industrial products	73.9	80.2	72.1	72.8	75.2	74.8	82.1	95.5	81.8	92.6
General index-number	75.5	74.8	74.8	75.7	78.0	79.2	89.6	106.0	86.6	100.6

(1) Most data for 1930 are provisional. — (2) Agricultural year April 1-March 31. — (3) Agricultural year July 1-June 30. — (4) Calculated by the Central Statistical Bureau of the Netherlands, reduced to the base 1925-1929 = 100.

LATEST INFORMATION

Hungary. (Telegram of 18 May) : Due to the normal course of temperature and to rainy weather winter wheat shows good development. Winter rye is generally thin and short. Spring crops are progressing satisfactorily.

An average crop is expected for winter wheat and rye.

A crop of colza below the average is expected.

Japan : According to a telegram of 19 May silkworm eggs incubated this year amount to 2,564,000 ounces against 2,798,000 last year and 2,560,000, the mean of the five years ending 1929. Percentages 92 and 100. Mulberry trees were in rather bad condition.

The crop condition of tea on 1 May was rather bad.

Java : Precipitation in April was considerable and resulted in the local spread of certain diseases. Arrowing has been still later than in 1930 and is below average. As far as production can be forecast at present it is generally expected to be above that of last year.

Palestine : In the Northern circle crop condition at 1st May was good for all cereals. Barley crops are excellent and heavy yields may be expected. Winter wheat gives rise to some apprehension owing to unseasonable scirocco winds, which have retarded growth. Hill crops are fair, suffering from drought, but it is anticipated that yields will be in excess of those of last year. On the coastal plain only mediocre yields can be expected. Afi wheat is on the whole good and should give average yields. In the Southern circle crop condition at 1st May was very poor. The failure of the March rains has caused widespread damage to cereals, especially wheat. Both winter and afi wheat and barley will be a failure in the Southern portions of the Gaza district, where, with few exceptions, all crops are being grazed. In the northern parts of the Southern circle cereals may be said to be about average and in a few parts are good.

Olive-trees are flowering under favourable conditions. Crop condition at 1st May was average.

Sowing of sesamum is in progress. In Southern Palestine sowing is completed in parts, but the areas under this crop will be small owing to the lack of late rains.

Early sown forage crops of maize have germinated. Where mixed with vetch for hay, the oat crop has been cut with good results. The growth of bersim is good.

Egypt : Sowing almost everywhere terminated in April. The area under cotton appears to have decreased comparatively slightly from last year both in Lower Egypt, where the scarcity of water in the rice-growing sections seems, however, to have induced several landholders to replace rice by cotton, and in Upper Egypt, where the decrease should be 10-20 %, the agreement between the Government and the sugar industry having encouraged an increase in the area under cane.

Temperature in April was irregular with strong cold winds and in Lower Egypt distinctly unfavourable to germination, being lower than usual, accompanied during the night by high humidity. The plants, however, are in good condition, though a little backward in so far as the late crops in the north of the Delta are concerned ; on the other hand they are making normal progress in Upper Egypt. Germination is now general and has occurred under fairly good conditions, save in the north of the Delta,

where stormy weather has somewhat retarded it. Resowings, though more extensive than last year at the same date, owing especially to losses caused by the bad weather and parasites, have been on the whole of little importance in Lower Egypt and of minimum importance in Upper Egypt. Irrigation water has generally been sufficient, save in fields at the extremities of certain canals in Lower Egypt and the Fayum. Rotations are now on the basis of six days irrigation to twelve without. Thinning, cultivation and irrigation of early crops continue. Some losses from parasites are reported, especially in the northern sections of the Delta, but chemical treatment, poisoned baits and other means have checked this evil. In certain localities resowing has been preferred and in the areas most seriously attacked has attained up to 20 % of the area.

Crop condition of sugar-cane on 1 May was 100 against 102 on 1 April 1931 and on 1 May 1930.

Crop condition of bersim on 1 May was 100 against 99 on 1 April last and on 1 May 1930.

Union of South Africa: The second preliminary estimate of maize production is 33,764,000 centals (60,293,000 bushels) a decrease on the first estimate. Droughty conditions during March in certain areas were the cause of considerable damage to the crop, at that time in the critical stage of growth. In the most important producing areas, namely, the eastern Transvaal high-veld and the northern Orange Free State, very little damage was, however, caused and many excellent yields are expected. In some districts the March reports indicate even an improvement on those of February. Owing to the general lateness of the plantings damage may still be caused by early frosts but account cannot be taken of this possibility at the present stage of the crop. The recent rains were too late to benefit the maize crops, those damaged by the drought being past recovery.

Although there may have been a small increase in the plantings of yellow maize in comparison with white maize, it is improbable that the percentage of yellow maize in the total production of the Union will vary greatly from that of previous years.

The area under cotton this year is estimated at 31,370 acres, a decrease of 36.6 % on that of 1929-30 and of 61.4 % on the mean of the five years ending 1928-29.

Crop condition on 1 May was fair, the prolonged drought having materially reduced expectations. Irrigated cotton is in good condition but severe attacks of boll-worm are reported in some districts. Ginning has commenced.

The total European crop of groundnuts is estimated at 79,800 centals, 51 % of last season's production and 67 % of the average for the five years ending 1928-29. The chief cause of the reduction is the poor crop expected in the Potgietersrust district, which produced more than 50 % of the crop last season.

MONTHLY CROP REPORT

AND AGRICULTURAL STATISTICS

The following notes refer to crop conditions quoted in the crop reports and in the tables. — Crop condition according to the system of the country: Germany, Austria, Hungary, Luxemburg and Czechoslovakia: 1 = excellent, 2 = good, 3 = average, 4 = bad, 5 = very bad; France: 100 = excellent, 70 = good, 60 = fairly good, 50 = average, 30 = bad; Lithuania, Poland, Sweden and Switzerland: 5 = excellent, 4 = good, 3 = average, 2 = bad, 1 = very bad; Netherlands: 90 = excellent, 70 = good, 60 = fairly good, 50 = below average; U. S. S. R.: 5 = good, 4 = above the average, 3 = average, 2 = below average, 1 = bad; United States: 100 = crop condition which promises a normal yield. — For other countries the system of the Institute is employed: 100 = crop condition which promises a yield equal to the average of the last ten years.

(For Latest Information see page 370).

CROP CONDITIONS AND FORECAST OF PRODUCTION OF CEREALS.

In Europe the general situation of winter cereal crops at the beginning of May was characterised by a general and notable backwardness of growth arising from the cold and in some areas excessively wet spring weather. To ensure good harvest results, very favourable weather conditions would have been necessary during the following months. Information at present possessed on conditions during May indicate that in most European countries they satisfied the needs of cereal plants, which were greatly benefited by the alternation of periods of rain and sunshine, good luminosity and aeration and a gradual rise in temperature; there was, however, no lack of seasonal adversities and violent winds and hailstorms caused "laying" and damage to a rather greater extent than usual. On the whole, the situation of crops on June 1 had greatly improved compared with the preceding month, but in several countries remained rather inferior to that of the same period of last year. If, moreover, it is taken into account that last year, the period of ripening and harvesting was marked in several countries by particularly adverse conditions due to excessive rainfall in June and July, it may still be considered probable, given a normal course of events during the coming months, that the total wheat production of Europe excluding the U. S. S. R. may exceed the 820 million centals (1,360 million bushels) obtained in 1930, as the area sown to wheat this year is almost equal to that of last year. A rapid review of the conditions existing in the principal European countries producing wheat, permits the following comments: In France the crop varies in condition although considerably improved compared with a month ago; yields are anticipated to be almost average on an area 500,000 acres smaller than that of last year. A larger crop than the poor one of last year may be justifiably anticipated, especially as conditions improved in the first half of June. Italy also looks forward to a larger crop; private estimates place production between 140-150 million centals (240-250 million bushels) compared with 126 (210) in 1930. In Spain the situation of crops is satisfactory although the spring rains were not altogether sufficient; the area has increased by 350,000 acres. The crop in prospect therefore does not differ greatly from that of 1930. In Germany, crop condition on 1st June although improved, is still decidedly inferior to that at the corresponding period of 1930; it should be noted, however, that last year the crop situation gradually deteriorated in the following months. If weather conditions continue to be favourable, in this country also prospects for production may be said to differ little compared with last year, since the grain area is now larger despite the loss of sowings in the winter.

In the Danubian group of countries, Bulgaria, Rumania and Yugoslavia, announce an excellent situation and a prospective heavy production; Hungary, on the contrary, expects about an average crop.

In Central Europe (Poland, Czechoslovakia and Austria) the crop situation is, on the whole, fairly promising.

The possibility is not to be excluded consequently, of a European wheat crop rather larger than the mediocre production of last year. In the case of rye, on the contrary, due to the considerably reduced acreage sown, and the not altogether favourable course of the season in some producing countries, prospects for 1931 point to a production somewhat smaller than that obtained in 1930, which was, however, a year of good production. For spring cereals, the crop situation at the beginning of June was promising, especially for barley.

In the U. S. S. R., it is estimated that the winter wheat area has reached 30 million acres; spring wheat sowings had been effected, on June 5, on about 60 million acres out of the 70 million acres anticipated in the State plan. It seems difficult to believe that the forecasts of this plan will be completely realised as, at the end of May, and at the beginning of June sowing was slackening and the proper period for this operation had already elapsed. May was generally favourable to the development of crops, there having been frequent rains throughout almost the entire Union. According to official information, the situation as regards winter wheat and rye on 1 June was average over a great part of the country and even above average in several important districts of production. Sowings of spring cereals were effected under soil conditions favourable to good germination.

In the United States the course of the weather in May was sufficiently favourable to development of winter cereals, though in some areas (North Pacific and Kansas) there have not been wanting complaints of insufficient rains. The official estimates, however, based on crop condition on 1 June, indicate only a very slight decrease on the estimate published in the preceding month. In the following table the estimates for 1 May and 1 June of this year are compared with those of the preceding years and with the actual results in a series of previous years.

UNITED STATES. — *Winter wheat.*

Year of production	Area		% of area not harvested	Crop condition on June 1st	Yield per acre				Production				
	Sown	Harvested			Forecasted at June 1st		Actually obtained		Forecasted at June 1st		Actually obtained		
					centals	bushels	centals	bushels	thousand centals	bushels	thousand centals	bushels	
	thousand acres												
1931..	41,993 (1)	40,432 (2)	3.7	84.3	9.6	16.1	...	...	389,400	649,000	...	...	...
1930..	42,518	39,608	9.2	71.7	8.3	13.8	9.4	15.7	319,481	532,469	362,602	604,337	...
1929..	42,720	40,059	6.2	70.6	9.3	15.4	8.6	14.4	373,289	622,148	345,728	576,213	...
1928..	47,317	36,213	23.5	73.6	8.5	14.2	9.6	16.0	307,513	512,252	347,204	518,673	...
1927..	43,373	37,723	13.0	72.2	8.5	14.2	8.8	14.7	322,201	537,001	331,648	552,747	...
1926..	39,887	36,987	7.3	76.5	8.8	14.6	10.2	17.0	325,800	543,000	376,460	621,438	...
1925..	39,848	31,234	21.6	66.5	7.8	12.4	7.7	12.9	244,294	407,166	241,040	401,784	...
1924..	38,916	35,656	8.4	74.0	8.6	13.8	10.0	16.6	305,591	509,319	355,355	592,259	...
1923..	46,091	39,508	14.3	76.3	8.8	14.7	8.7	14.5	348,325	580,541	343,066	571,777	...
1922..	47,930	42,358	11.6	81.9	8.6	15.9	8.3	13.8	364,200	607,000	352,127	586,878	...
1921..	45,625	43,414	4.8	77.9	8.0	14.9	8.3	13.8	346,800	578,000	360,190	600,316	...
1920..	44,861	40,016	10.8	78.2	7.6	14.8	9.2	15.3	302,400	504,000	366,358	610,597	...
1919..	51,483	50,494	1.9	94.9	10.6	18.2	9.0	15.1	536,800	893,000	456,228	760,377	...
1918..	43,126	37,130	13.9	83.8	9.5	16.1	9.1	15.2	352,149	586,915	339,059	565,099	...
1917..	38,359	27,257	28.9	70.9	8.2	13.5	9.1	15.1	223,800	373,000	241,741	412,901	...
1916..	39,245	34,709	11.6	73.2	8.1	14.2	8.3	13.8	281,400	469,000	283,332	480,558	...
1915..	42,481	41,308	2.6	85.8	9.8	16.8	9.8	16.3	405,600	676,000	404,368	673,947	...
1914..	37,158	36,008	3.1	92.7	10.6	18.0	11.4	19.0	332,800	638,000	410,904	684,990	...
1913..	38,274	31,699	4.7	83.5	9.3	15.9	9.9	16.5	295,200	492,000	314,137	523,561	...

(1) Area to be harvested. — (2) Percentage of area abandoned at May 1st.

The production forecast for this year is one of the highest in the last twenty years and if in the latter half of June the weather remains favourable to ripening, as it generally was in the first half, the expected crop may be fully realised.

Such a production of winter wheat would be alone sufficient to cover the consump-

tion of wheat in the United States. The supplies available for export in the new season 1931-32 would be made up therefore by the great mass of stocks from the old crop and by a quantity corresponding approximately to the coming harvest of spring wheat. The development of the latter in May has not been very satisfactory owing to the scarcity of precipitation in the greater part of the cultivated belt. Crop condition on 1 June was in fact, one of the least satisfactory recorded in recent years. However, in the first half of June there were abundant rains over a large part of the belt, considerably improving the prospects of the crop which, according to private information, is estimated at about 120-130 million centals (200 to 220 million bushels).

In Canada the crop situation, already at the end of May rather bad owing to drought and scarcity of soil moisture, continued to grow worse in the first half of June.

The necessary rains fell in sufficient quantity only in a few districts of the Prairie Provinces, while in others there were showers or sporadic rains bringing only temporary benefit; in some parts of Saskatchewan where rains were totally lacking the crop may be considered completely lost, without possibility of resowing. Prospects in Canada are therefore, for a crop below the average; private estimates place it at about 150 million centals (250 million bushels) against 238 million centals (397 million bushels) in 1930.

In North Africa from Morocco to Tunis the wheat crop promises to be sufficiently large and should be still larger as a result of the generally favourable weather in May, if by the end of the month the scirocco had not blown, as that causes damage by inducing too rapid ripening. The barley crop appears generally less satisfactory than that of wheat. In Egypt crop condition on 1 June was slightly better than in May and yields of wheat and barley above the normal are expected.

The last report from India has slightly reduced the estimate of wheat production from 208.1 million centals (346.9 million bushels) to 206.6 million (344.3 million). Amongst the other producing countries of Asia, Japan expects not too good crops of wheat and barley and Palestine a crop on the whole greater than last year.

As a general conclusion to this examination of the prospects of production in the northern hemisphere it may be said that at the present time there is a probability of a wheat crop above the average and of a rye crop about the average.

Sowings in the southern hemisphere were begun in fairly favourable conditions; only in some districts of Australia are there complaints of excessive precipitation.

G. C.

Germany: Thanks to the heat that began in May recent development of crops has generally been good. Nevertheless the injurious effects of the prolonged winter are still felt, particularly in less favourably situated districts. The fields sown to winter cereals are often thin. As to spring crops there are complaints in some districts of heavy weed infestation.

At the beginning of June crop condition of winter spelt was 2.7 against 2.8 on 1 May 1930 and 2.3 on 1 June 1930.

Resowing has been necessary over a larger proportion of the area than was formerly thought. Expressed as percentages of cultivated area they amounted to 3.0 for winter rye (0.1 in 1930), 3.8 for winter wheat (0.7 in 1930), 3.1 for winter spelt (0.9) and 3.5 for winter barley (0.2).

Austria: The rise in temperatures experienced at the end of April continued in the early part of May. At the beginning of the month there were some rains, generally small in quantity. Humidity, already low at the beginning of growth, especially in the northern plains and in the east, steadily decreased owing to the frequent winds. Towards 20 May rains were reported in various regions with beneficial results to the crops, but the excessive heat that ensued everywhere dried and cracked the soil.

COUNTRIES	AREA SOWN					CROP CONDITION (†)													
	1930-31	1929-30	Average 1924-25 to 1928-29	% 1930-31		1-VI-1931			1-V-1931			1-VI-1930							
				1929-30 = 100	Aver. = 100	a)	b)	c)	a)	b)	c)	a)	b)	c)					
															Thousand acres				
Canada (6) . . {w}	865	1,091	591	79.3	146.4	—	—	—	—	—	—	—	—	—	—	—	—	—	—
United States (6) . . {s}	292	357	203	81.8	143.8	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total America . . .	3,793	3,722	3,601	101.9	105.3	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Algeria	4,950	5,170	4,395	95.7	112.7	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Grand Total . . {m}	2	5	3	43.5	62.8	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	51,261	54,973	50,832	94.8	100.6	—	—	—	—	—	—	—	—	—	—	—	—	—	—
BARLEY																			
Germany . . {w}	(1) 494	(2) 484	(2) 409	—	—	2.8	—	—	—	2.9	—	—	—	—	—	—	—	2.5	—
	...	3,287	3,287	...	...	2.5	—	—	—	2.5	—	—	—	—	—	—	—	2.5	—
Austria . . {w}	...	18	24	...	...	2.5	—	—	—	2.8	—	—	—	—	—	—	—	2.3	—
	...	411	346	...	...	2.8	—	—	—	2.3	—	—	—	—	—	—	—	2.4	—
Belgium . . {w}	70	73	76	90.1	91.9	—	f)	—	—	f)	—	—	—	—	—	—	—	d)	—
Bulgaria . .	652	673	562	96.9	116.1	145	—	—	—	145	—	—	—	—	—	—	—	145	—
Spain	4,890	4,890	—	100.0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Finland . . .	276	272	271	101.4	101.7	—	—	—	—	—	—	—	—	—	—	—	—	—	—
France	1,955	1,799	1,739	108.6	112.4	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Scotland . .	...	107	121	...	...	—	100	—	—	—	—	—	—	—	—	—	—	100	—
Hungary . . .	...	1,139	1,065	...	...	(3) 2.7	—	—	—	—	—	—	—	—	—	—	—	(3) 2.5	—
Lithuania . .	...	529	494	...	...	3.5	—	—	—	—	—	—	—	—	—	—	—	3.6	—
Luxemburg . .	9	7	8	116.1	101.9	2.3	—	—	—	—	—	—	—	—	—	—	—	2.1	—
Netherlands . .	69	76	71	91.3	97.6	—	(4) 72	—	—	—	—	—	—	—	—	—	—	(4) 70	—
Poland . . . {w}	143	142	174	100.6	82.4	...	...	...	...	3.0	—	—	—	—	—	—	—	3.6	—
Rumania . . {w}	248	296	252	83.9	98.5	...	...	...	...	—	—	—	—	—	—	—	—	—	—
	...	4,585	4,109	...	...	e)	—	—	—	—	—	—	—	—	—	—	—	—	—
Switzerland . .	...	16	16	...	...	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Czechoslovakia .	1,759	1,679	1,706	104.8	99.6	2.7	—	—	—	2.7	—	—	—	—	—	—	—	2.5	—
Yugoslavia . . {w}	611	637	556	95.9	109.8	e)	—	—	—	d)	—	—	—	—	—	—	—	e)	—
Canada	4,734	5,559	4,297	85.2	110.2	—	—	—	—	85	—	—	—	—	—	—	—	—	—
United States . .	...	12,437	10,222	...	...	—	—	—	—	77.2	—	—	—	—	—	—	—	86.4	—
Japan . . . . .	...	2,110	2,336	...	...	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Syria and Lebanon	818	840	706	97.4	115.9	—	—	—	—	f) g)	—	—	—	—	—	—	—	f)	—
Algeria	3,123	3,650	3,445	85.6	90.7	—	—	—	—	75	—	—	—	—	—	—	—	100	—
Cyrenaica . . .	82	127	133	64.5	61.3	—	—	—	—	65	—	—	—	—	—	—	—	—	—
Egypt . . . . .	...	345	368	...	...	105	—	—	—	103	—	—	—	—	—	—	—	103	—
Fr. Morocco . .	3,038	2,955	3,028	102.8	100.3	e)	—	—	—	—	—	—	—	—	—	—	—	f)	—
Tripolitania . .	371	247	—	150.0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Tunis	938	(7) 988	1,243	100.0	79.5	—	—	—	—	75	—	—	—	—	—	—	—	—	—
OATS																			
Germany . . . .	...	8,499	8,645	...	...	2.7	—	—	—	—	—	—	—	—	—	—	—	2.6	—
Austria . . . .	...	772	757	...	...	2.7	—	—	—	2.5	—	—	—	—	—	—	—	2.4	—
Belgium . . . .	...	674	678	...	...	—	f)	—	—	—	—	—	—	—	—	—	—	d)	—
Bulgaria	326	340	338	96.0	96.6	140	—	—	—	140	—	—	—	—	—	—	—	160	—
Spain	1,693	1,840	—	92.1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Finland	1,140	1,137	1,110	101.1	103.5	—	—	—	—	—	—	—	—	—	—	—	—	—	—
France	8,632	8,583	8,623	100.0	100.1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Scotland . . . .	...	862	906	...	...	—	—	—	—	100	—	—	—	—	—	—	—	100	—
Hungary . . . .	...	611	694	...	...	(3) 2.9	—	—	—	—	—	—	—	—	—	—	—	(3) 2.6	—
Lithuania . . .	...	855	828	...	...	3.5	—	—	—	—	—	—	—	—	—	—	—	3.6	—
Luxemburg . . .	70	70	72	100.0	97.6	2.2	—	—	—	2.5	—	—	—	—	—	—	—	2.0	—
Netherlands . .	336	370	377	98.8	96.9	(4) 71	—	—	—	—	—	—	—	—	—	—	—	(4) 75	—
Poland . . . . .	...	5,404	5,007	...	...	3.3	—	—	—	—	—	—	—	—	—	—	—	3.5	—
Rumania . . . .	...	2,696	2,806	...	...	e)	—	—	—	—	—	—	—	—	—	—	—	—	—
Switzerland . .	...	48	50	...	...	—	—	—	—	97	—	—	—	—	—	—	—	96	100
Czechoslovakia .	2,116	2,056	2,078	102.9	101.9	2.7	—	—	—	2.5	—	—	—	—	—	—	—	2.3	—
Canada	13,336	13,259	12,831	100.6	103.9	—	—	—	—	88	—	—	—	—	—	—	—	—	96
United States . .	...	41,596	42,554	...	...	84.7	—	—	—	—	—	—	—	—	—	—	—	83.2	—
Syria and Lebanon	27	28	41	95.9	66.8	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Algeria	541	638	605	84.8	89.5	—	—	—	—	75	—	—	—	—	—	—	—	100	—
Fr. Morocco . .	73	84	71	87.6	103.7	e)	—	—	—	—	—	—	—	—	—	—	—	f)	—
Tunis	99	(7) 99	104	100.0	94.7	—	—	—	—	75	120	—	—	—	—	—	—	—	—

* Countries not included in the totals. — a) above the average. — b) average. — c) below the average. — d) very good. — e) good. — f) average. — g) bad. — m) not including Ukraine. — n) including Ukraine. (†) See explanation according to the various systems, page 907. — w) Winter crops. — s) Spring crops. — (1) December estimate. — (2) May estimate. — (3) On May 27. — (4) Towards the middle of month. — (5) Including spelt and meslin. — (6) The area for 1931 is that which it is anticipated will be harvested; for previous years the figures refer to the area harvested. — (7) Provisional estimate made last year on the same date.

At the end of May winter sowings were still developing under relatively satisfactory conditions, though the formation of ears leaves much to be desired. Spring sowings are considerably retarded. Sprouting was slow and irregular.

Belgium : The beginning of May was rainy and cold with winds from the north and northeast and night frosts. Subsequently the weather improved and towards the end of the month there was a series of very warm sunny days, with mild nights and some heavy rainstorms.

In general growth is backward. Autumn cereals have improved but their height is below normal. Much of the rye is thin. Spring sowings are showing well. Crop condition of spelt and of mixed corn on 1 June 1931 was reckoned as "average", as on 1 May 1931 against "excellent" on 1 June 1930.

Bulgaria : During the first ten days of May, the weather was good and sunny. In the remainder of the month heavy rains fell with storm rain in the last few days. These conditions favoured cereals, which developed perfectly. No damage was reported due to diseases, adverse weather or animal pests. At the end of the month harvesting of early barley began. The area sown to mixed cereals this year is estimated at 257,000 acres or nearly equal to that of last year and 7.5 % above the average for the period 1925-29.

Irish Free State : Weather during the greater part of May was cold and unsettled, with frequent showers and frost at night. The last decade of the month was warmer and growth was accelerated, crops having now a promising appearance, though backward as compared with last year.

Estonia : According to reports of correspondents crop condition of winter rye was 95 % and that of winter wheat 93 % of the average of the last ten years. Weather is favourable.

France : The second week of May on the whole brought about a considerable improvement in cereals particularly wheat, which greened up again everywhere and showed vigorous growth and a good appearance, especially in the principal producing regions. The latter half of May was characterised by abrupt weather changes, short periods of fine very hot and sunny weather interrupted by rainy periods accompanied sometimes by particularly injurious cold and sometimes by heat and strong winds with hail until the end of the month, causing local damage. Despite this not very favourable situation, the appearance of wheat on June 1 was good on permeable lands whereas on impermeable and low-lying lands there was some damage together with the appearance of thin patches and the growth of weeds. In the Centre wheat is generally thin. It is feared moreover, that the bad weather will have further effects in provoking "laying" of cereals, whether directly or by encouraging the spreading of *take all*.

The soil, made heavy and compact by the violent rains, admits little heat. Despite some rainy days and storms towards June 8 earing and flowering took place under generally favourable conditions. It is feared, however that the sudden large rise in temperature will provoke drying up in southern regions. If the weather remains favourable until harvest, yields will probably be about average. Other winter cereals are in good condition. Spring cereals, especially those sown late, have a less good appearance. Oats are generally infested by weeds which could not be removed due to unfavourable weather lasting until the beginning of June. Lastly, in the Centre, rye is in mediocre condition. Their aspect improved considerably in the first half of June.

Great Britain and Northern Ireland : In the first two or three weeks of May weather throughout the area was generally unfavourable with low temperatures and ground frosts at night and, in England and Wales and Northern Ireland, considerable rain. High winds also prevailed in Northern Ireland. Toward the end of the month, however, conditions improved, especially in England and Wales, where warmer and sunnier wea-

ther prevailed almost everywhere in the latter half of the month. Germination and early growth of cereals which had, throughout the area, been retarded by the cold, dull winter and early spring, made considerable progress. In England and Wales at the end of the month condition of all cereal crops was reported as satisfactory, though in some areas loss of colour was noticeable and there were complaints of damage by pests. Scotland is on the whole free from insect pests, though damage has been caused in a few districts by wireworm and the maggot of the wheat bulb fly, while in Northern Ireland the crop is looking well though in some instances thin. Oats are generally vigorous and thick on the ground in Scotland though some damage by wireworm and grub has been reported; in Northern Ireland, too, they are looking well in most districts, though the leather-jackets are in evidence in places.

In England and Wales the area under wheat is somewhat less than in 1930, that under oats is about the same as in 1930 and that under barley has increased.

Hungary : In the two weeks from 12 to 27 May weather was characterised by high temperatures and lack of precipitation. Distribution of precipitation was not uniform. While in the northern and northeastern districts the amount was about half the normal in various localities, on the great plain of the Alföld and on the right bank of the Danube, it has only reached one-third of the normal. In several districts local storms have been reported, but these have not caused very significant losses. At the end of May wheat was generally developing well and had a good appearance. In the Northern districts crop condition was for the most part rather unsatisfactory. Rye was everywhere in ear. In general it is low and thin and the ears are not sufficiently long. Crop condition varies much from one district to another. Winter barley is generally sufficiently thick and is developing well. Due to the lack of humidity in various districts growth of oats has ceased, but at the end of May was nevertheless sufficiently healthy and thick.

According to a recent Government report, in the period May 27-June 13, the weather was abnormal and characterised by very high temperatures and frequent storms. At the end of the period considered wheat was in flower. Although the weather conditions had a generally favourable influence on the growth of wheat, the crop is rather short in stature, thin and infested with weeds. The ears are small. In some provinces damage by insects is also reported.

The condition of rye is generally weak. Winter barley has developed well, while spring barley is less satisfactory. Oats crops are in very backward condition due to drought and insect attacks.

On June 13 crop condition was as follows: wheat : 3.1; rye : 3.2; barley : 3.1; oats : 3.6.

Italy : Weather in the first half of May was variable, with fairly high temperatures. Growth condition of wheat has greatly improved and in some districts of the south reaping has begun. Oats, barley, and rye continue to have a good appearance.

In the second half of the month the weather was, at first prevalently rainy, then calm and warm. Wheat at the end of the month promised a crop superior to that of last year, despite weeds, some cryptogamic attacks and the partial laying of late varieties.

Latvia : Although at the beginning of May there were some night frosts and hail damage, the average temperature for the month was very high and from 2 to 3 degrees above the normal. According to the reports of correspondents, the crop condition of winter wheat on June 1 was average in 39.3 % of the cases above the average in 11.3 % and below it in 49.4 %; corresponding figures for rye, were 21.0%, 4.7% and 74.3 %.

Lithuania : During May, no complaint was made of night frosts and weather conditions in general favoured growth; the situation of winter rye, however, has not improved.

Spring cereals have sprouted uniformly.

Luxemburg : In May weather was generally favourable to development.

Norway : The spring was late this year; the weather was cold and plenty of rain fell,

especially in the eastern and southern regions. A large part of the oats could not be sown.

Poland : During the first half of May, the weather was rather warm. There was, consequently, sufficient warmth but reserves of soil moisture were low. In the latter half of the month and in the first few days of June, conditions of temperature remained unchanged and crop benefited by a greater amount of soil moisture.

Rumania : In the second half of May weather was favourable to growth. Copious rains were experienced almost everywhere in the country. At the end of May only limited districts particularly in the south of Bessarabia and on the high plateau of Transylvania had need of precipitation.

The official report of 8 June intimated "copious rains" and very favourable weather conditions generally.

Crop condition of winter crops is generally excellent save in the districts that have suffered from drought. At the end of May spring sowings were completed and the favourable weather has accelerated their development.

Hail and floods were experienced only in a few districts. No serious damage is reported. Damage caused by cryptogamic diseases are also only local and of small importance. In the delta of the Danube and on the left bank of the lower Danube up to the departments of Covurlin and Ismail large bodies of locusts are reported. The local authorities and the Ministry of Agriculture have taken the necessary measures to combat this plague.

Sweden : During the winter the ground did not freeze because of the considerable snow cover and winter cereals were greatly damaged with the result that it has been necessary to cultivate the fields for re-sowing with spring cereals.

Switzerland : Cereals have been benefited by warm but insufficiently wet weather in May. Winter wheat has recovered particularly well from the effects of the winter. In the case of spelt and rye, on the contrary, the favourable temperatures have not compensated for the winter damage and fields are a little thin. On the whole, despite the advantageous weather in May, cereal crops have a rather less favourable aspect than at the same period of last year. Towards the end of the month, heavy falls of hail seriously damaged cereals in different areas of the country (Berne, Soleure, Argovie and Thurgovie). Crop condition of spelt on June 1, 1931, according to the Institute's system, was 97 against 96 on May 1, 1931 and 100 on June 1, 1930. Those for mixed grain were 98, 95 and 100 respectively.

Yugoslavia : The prevalently wet weather in the first half of May greatly favoured the growth of winter sowings. In the latter half of the month the variable and rather hot and dry weather was very propitious to all winter and spring crops. On the basis of crop condition towards the end of the month and allowing for the eventual occurrence of adverse weather, good crops of all cereals may be anticipated and particularly of winter wheat.

U. S. S. R. : According to information issued by the Commissariat for Agriculture, the area to be sown to all winter and spring crops during the season 1930-31 is anticipated in the State plan at about 353 million acres. Of this acreage 106 millions have been assigned to winter crops and 247 millions to spring crops. Of the 106 million acres destined to winter crops (6.9 millions to Sovkhoz, 64 millions to Kolkhoz and 35.1 millions to individual agriculture holdings) 74 are to be sown to rye, 31.1 to wheat and 0.9 to barley and other crops. It is not yet known whether it has been possible to realise the plan completely for winter crops. Of the 247 million acres anticipated for spring crops, about 173 millions are to be sown to the different cereals according to the following distribution : wheat 69 million acres, oats 44, barley 17, maize 12, and other cereals 28 million acres.

According to information from the same source, spring sowings since their beginning were a little hindered by the lateness of the spring and in May they did not advance with the rapidity desired, principally on the individual agricultural holdings and on the Kolkhoz. Thus on 1 May only 13.7% had been sown, on 5 May only 24.6%, on 10 May 35.8 %, on 15 May 46.2 %, on 20 May 56.6 %, on 25 May 66.4 % and on 1 June 75.4 % of the acreages anticipated in the plan. The Government, because of slowness in execution, has taken energetic steps to accelerate sowings on the Kolkhoz, on which also, piece work rates have been substituted for time work rates for work done by the peasant. As sowings have been terminated on the Sovkhoz, all labourers and tractors thus liberated have been sent to furnish assistance on the individual holdings. Thanks to these energetic measures taken by the Government, the area sown as on June 5 was 208,431,000 acres and represented 84.4 % of that forecasted in the plan. On 5 June the area sown to spring wheat reached about 59 million acres, or 86.1 % of that planned ; that sown to spring barley, 14.3 million acres or 81.0 % of the acreage planned and to oats about 36 millions or 81.6 %. In general spring wheat sowing should not be prolonged after the latter half of May, although last year they were continued until June and a good crop was obtained.

Following on the prevalently cool weather of the first decade of May, temperatures have gradually increased. Frequent but not very copious rains fell everywhere, especially in the latter half of the month. In the early part of June dry, hot weather again prevailed. Winter cereals have developed normally. Their crop condition on 1 June was prevalently average and, in some districts of the principal producing regions, above the average.

Germination and growth of spring cereals have proceeded at a tempo similar to that of last season and the crops present an appearance generally equal to that of last year and in some districts even better. Crop condition on 1 June was prevalently average.

Argentina : Work of preparing the soil and sowing of cereals were effected under good conditions. The figure of area sown to cereals for the coming season 1931-32 is not yet known. Some commercial groups are suggesting a reduction of acreage to the extent of 5-20 %. The campaign for the experimental reduction by 10 % of the area to be sown to wheat, initiated by the Ministry of Agriculture, has been supported by the entire press of the country, which also advised a larger eventual diversification of production. The Ministry has not only recommended the use of selected pure seed in order to obtain higher yields per acre and a diminution of the cost of production, but has also recommended the largest possible diversification of crops so that for 100 acres of land not more than 30 should be sown to wheat and of the remainder 20 to maize, 20 to flax, 5 to oats and barley and 25 to alfalfa, beans, peas and chick peas. With reference to these three leguminous crops, the Ministry has increased tariff protection to reduce imports in order that the home market may be supplied directly by home production. Further, the Ministry has appointed a Technical Commission to study the varieties of wheat to be recommended for the sowing of crops for export, and to decide on the steps to be taken to obtain a more rigorous inspection of cereals to be exported. This Commission has divided the whole agricultural territory of the Republic into three zones, for each of which, according to its special conditions of soil and climate, the Commission has recommended certain varieties of wheat and the total abandonment of other varieties.

Canada : According a report dated May 19 published by the Saskatchewan Department of Agriculture, wheat seedling in the province was about 95% completed and coarse grains about 50 % seeded. Conditions except for wind had been favourable for seeding although some farmers preferred to postpone it on account of the dry condition of the soil. Despite some showers, more rain was urgently needed in central and southern parts of the province due to the deficiency of soil moisture. Germination had been fairly

satisfactory, although somewhat slow and in some cases uneven. All the first sown wheat was showing green but growth was generally slow. High winds, some exceptionally hot days, and considerable soil blowing caused local damage.

Telegraphic information from the Canadian Government informs that at the beginning of June, practically the entire western region of Canada of normally heaviest grain production, was in critical condition due to intense and prolonged drought combined with damage by high winds, frost and cutworms. Only districts on the fringe of the main area report fair conditions. The regions suffering most are western Manitoba, the whole of southern and central Saskatchewan and southern and central Alberta. On June 10 the Canadian Government communicated that the crop condition of spring wheat at the end of May was the lowest recorded for that period since 1909. Rains during the week had been helpful in some areas of Manitoba and Alberta. In the Peace-River area crops were described to be excellent but no relief had been obtained in the large central wheat producing area extending from Brandon, Manitoba, through most of arable Saskatchewan, and across central Alberta to the foothills. Grain crops in the driest areas of Saskatchewan had been damaged beyond recovery and re-seeding was impractical.

A later telegram of June 16th received from the Canadian Government, informed that due to the drought grain crops in Manitoba and Saskatchewan were distinctly poor. Rains during the week were spotty and not of material and lasting benefit. Large areas of these provinces cannot produce average yields and in some regions of south central Saskatchewan complete crop failure is indicated. In Alberta crops were improved generally by precipitation during the week but needed more in the southern and central areas of the province.

Expressed as a percentage of the average yield per acre for the previous ten years, crop condition of mixed grains on June 1, 1931 was 99 against 101 on June 1, 1930.

United States : On about May 20th. the crop condition of winter wheat was good while in the spring wheat States rain was wanted ; these conditions remained on the whole unchanged at the end of the following week ; in this period the progress and condition of winter wheat were very good to excellent in the Ohio Valley, with the crop heading in many districts although there was some retardation by cool weather ; local complaints of rank growth and lodging were noted. Heading had begun northward to Nebraska, and in this area progress of the crop was fair to very good, although in Western Kansas there was some deterioration due to an absence of subsoil moisture. The winter crop was ripening in the Southwest northward to southern Oklahoma, while in the Southeast harvesting was proceeding in Georgia. In the Pacific Northwest there occurred considerable damage due to the persistent drought and frost, rains being generally needed. In the spring wheat in the same period the absence of rain and the cold temperatures caused a general retardation of growth and some injury making partial re-sowing necessary. Soil blowing was reported in places. In the same week, oats continued to do well rather generally except for some retardation of growth in more northern sections of the country ; harvesting made good progress in southern sections. Barley in the northern States was also retarded by cool weather. In the following fortnight up to June 10, ripening had well set in the South. Weather continued to be dry in the Pacific Northwest and crop condition was poor. The condition of spring wheat showed some improvement at the beginning of June but on the 10th of the month rain was still wanted. The percentages of the total acreage of oats sown to spring oats and winter oats respectively are as follows : 1931 : spring oats 57.3 % ; winter oats 42.7 % ; 1930 : 69.2 % and 30.8 % ; 1929 : 57.2 % and 42.8 %.

The forecast of winter wheat production is given on page 308.

Production of rye is estimated at 24,528,000 centals (43,800,000 bushels) com-

pared with 28,131,000 (50,234,000) in 1929-30 and the preceding five year average of 25,832,000 (46,129,000); percentages: 87.2 and 95.0.

Mexico: According to a first preliminary estimate of the Government production in 1930-31 is 9,099,000 centals (15,165,000 bushels) against 6,868,000 centals (11,446,000 bushels) last year and 6,456,000 centals (10,760,000 bushels), the average for 1925-29. Percentages: 132.5 and 140.9.

India: Harvested wheat in the Punjab suffered some local damage by river floods (in the district of Mianwali) and rain in May.

According to the third report, wheat production is estimated at 206,662,000 centals (344,437,000 bushels) against 229,981,000 (383,301,000) in 1929-30 and the average for the preceding five seasons of 191,341,000 (318,901,000); percentages: 89.9 and 108.

Palestine: Northern Circle: A season that might have ended in the failure of the late wheat crop, owing to the lack of late rains, was saved by the cool climatic conditions during April and the large reserve of moisture in the ground. The rainfall for the season was good, averaging some 750 millimetres in most of the area; the distribution, however, was not so satisfactory. Cereal crops are well up to standard, the yield exceeding that of last year by about 35 %. Crop condition as at 1st June was average. Winter wheat is ripening and out of danger from hot east winds, which prevailed during May. A good harvest is expected from afir wheat. Winter barley is ripening under favourable conditions and heavy yields are expected. Afir barley is being harvested; yields are excellent, except in hill areas of Jenin (East). — *Southern Circle*: As in Northern circle, the weather conditions during April were cool, with good dew fall at night; hot east winds prevailed during May. In general only bad yields can be expected from winter cereals south of the Ajur-Beit Jibrin-Faluje-Ashdud line. North of this line, as far as Ramleh, cereal crops are patchy and in most cases will give only poor to medium yields. Crop condition as at 1st June was poor to complete failure. Winter wheat and barley are a failure in Beersheba and southern Gaza district. Poor crops from there northward to Ramleh. Other areas are better. In the hills winter barley crops are ripening. Afir wheat harvesting is in progress; in general poor to medium yields only can be expected; good crops only in the Ramleh and Jaffa districts.

Algeria: May was a rather favourable month for earing and ripening of cereals. Rainfall was rare; towards the end of the month some storm showers fell and sirocco caused some damage to all crops.

All late cereal sowings lack somewhat in appearance as they have been particularly affected by the sirocco.

Wheat has eared under good conditions; this cereal has generally suffered from the drought and, although the aspect of the crops varies from region to region nearly average yields may, on the whole, be counted on.

Barley and oats which, due to their shorter cycle of growth, have had adequate moisture, looked more satisfactory; harvesting of these crops has been finished and yields seem to be fairly good.

Basutoland: A good crop of wheat was harvested in the mountain districts, but in the lowlands the crop was poor though of better quality than in 1929-30.

Cyrenaica: Wheat on the plateaux appears to be in good condition although the wet season had already ended at the beginning of May. The barley crop estimate is very low; no damage by locusts or cryptogamic disease is reported.

Egypt: Weather has been generally favourable. No damage has been reported save for barley, and that is not appreciable. The harvest ended in May. Yields of wheat in Upper Egypt are expected to exceed the average by 7 %; that of barley is slightly above the average.

French Morocco: The areas sown to cereals this year are among the largest of the

last 10 years; they have increased by about 1,236,000 acres since 1921-1922. The wheat area is practically the same as that estimated in May last year; it should be noted that the preliminary figure of 1930 was reduced by 575,000 acres by the final revision; the deviation usually does not exceed + 321,000 acres or — 148,000 acres.

Weather during the month, marked by well distributed rains, was generally favourable to the ripening of cereals. It is feared however, that early heat and sirocco winds at the end of the month have injured some wheat. Reaping of barley and oats is almost finished and that of wheat has begun. In general, fairly good yields are anticipated.

Tripolitania : In the last period of growth of wheat and barley there was a complete absence of rain. Crop condition on May 1, was average.

Tunisia : May further accentuated the situation reported in the previous month. Weather favoured vegetation in the North, which accounts for 64 % of the wheat crop but in the Centre and South, which account for 61 % of the barley, the drought has been prejudicial. Damage by *cecidomya* and Hessian fly is also reported.

The harvest was almost at an end by 20 June.

Union of South Africa : At the close of the summer there were unusually heavy rains throughout the Union, especially in the Cape Southwestern districts and in the South-eastern Free State and very extensive ploughing and sowing of winter grain crops was reported from all areas. In Natal a record area is probable.

MAIZE

Austria : At the beginning of May early sowings were again hoed. The plants are still generally very small in stature. On June 1, crop condition was 2.6, the same as on June 1, 1930.

Bulgaria : Abundant rains in the latter half of May greatly favoured maize, the crop condition of which (by the Institute's system) on June 1, was 120 against 140 last year. The area sown this year is estimated at 1,705,000 acres or nearly equal to that of last year and 2.0 % above the average of 1925-1929.

France : Alternate wet and fine weather, cold and warm temperatures, accompanied by some storms, were favourable to maize which had a good appearance at the beginning of June. In the southwest bad effects of the drought and very high temperatures were feared. This spring crop has been planted in fields which could not be sown, thus increasing its area compared with last year.

Hungary : At the end of May maize plants had sprouted uniformly and were growing well. The first hoeing began.

Italy : Sowings were finished in May; the crop had a vigorous appearance; cultivation was in progress.

Rumania : Early maize, although having suffered from cold at the beginning of April, has developed about normally. Late sowings have sprouted more vigorously and have a very good appearance. At the beginning of June the crop condition of maize was good.

Yugoslavia : The prevalently wet weather in the first half of May and warm, dry weather in the latter half of the month, greatly favoured the growth of maize crops. An excellent crop is anticipated unless the weather changes for the worse.

U. S. S. R. : According to the State plan, the area to be planted to maize this year should reach 12,355,000 acres against 9,637,000 planted last year. On June 5, there had been planted about 8,483,000 acres or 68.7 % of the area planned.

Argentina : Frosts in the first ten days of May in the southern area of Santa Fé have favoured the harvesting of maize, considerably diminishing the degree of natural moisture

Maize.

COUNTRIES	(†) AREA						(†) PRODUCTION						
	1930	1929	Aver. 1924 to 1928	% 1930 1930/31	1930	1929	Average 1924 to 1928	1930	1929	Average 1924 to 1928	% 1930 1930/31	1930	
	1930/31	1929/30	1924/25 to 1928/29	1929 — Aver.	1930/31	1929/30	1924/25 to 1928/29	1930/31	1929/30	1924/25 to 1928/29	1929 — Aver.	1930/31	
	1,000 acres	1,000 acres	1,000 acres	= 100	1,000 acres	1,000 acres	1,000 acres	1,000 bushels	1,000 bushels	1,000 bushels	= 100	1,000 bushels	
	1930/31	1929/30	1924/25 to 1928/29	1929 — Aver.	1930/31	1929/30	1924/25 to 1928/29	1930/31	1929/30	1924/25 to 1928/29	1929 — Aver.	1930/31	
Austria . . .	143	138	148	103.5	96.7	2,663	2,586	2,300	4,756	4,617	4,267	103.0	111.5
Bulgaria . . .	1,696	1,677	1,577	85.8	107.5	19,075	20,723	13,342	34,062	37,005	23,824	92.0	143.0
Spain . . .	1,072	1,006	1,088	106.6	98.5	15,303	13,884	13,257	27,327	24,704	23,073	110.2	115.4
France . . .	832	840	849	99.2	98.0	12,333	10,448	9,358	22,023	18,657	16,711	118.0	131.8
Greece . . .	337	344	502	97.9	67.1	2,004	3,342	3,502	4,810	5,967	6,253	80.6	76.9
Hungary . . .	2,005	2,774	2,599	93.9	100.2	31,021	39,554	39,037	55,394	70,632	71,316	78.4	77.7
Italy . . .	3,737	3,719	3,776	100.5	98.9	66,081	55,789	54,446	118,001	99,024	97,224	118.4	121.4
Poland . . .	233	218	216	106.8	108.0	1,847	2,101	1,935	3,299	3,752	3,455	87.9	55.5
Portugal . . .	868	904	763	93.0	113.7	9,364	8,357	7,584	16,722	14,924	13,543	112.1	123.5
Rumania . . .	10,930	11,849	10,026	92.3	109.1	99,648	140,792	89,232	177,942	251,414	159,343	70.8	111.7
Switzerland . .	3	3	3	100.1	96.5	87	80	84	156	159	150	97.5	103.4
Czechoslov. (1)	325	335	346	97.2	—	4,550	5,103	5,351	8,142	9,113	9,556	89.3	—
Yugoslavin. . .	5,026	5,729	5,006	103.4	118.4	76,381	91,441	65,801	156,395	163,287	117,501	83.5	116.1
* U. S. S. R. (2)	9,925	8,785	(3) 8,303	100.6	115.9	...	92,815	(3) 79,918	...	105,741	(3) 142,711	...	...
Total Europe	28,716	29,836	26,899	96.2	106.8	341,056	394,209	306,218	609,029	703,943	546,816	86.5	111.4
Argentina . . .	11,738	10,428	8,677	112.6	135.3	207,710	157,146	153,014	371,054	280,619	273,239	132.2	135.8
Canada . . .	102	152	203	105.9	79.4	3,26	2,902	4,490	5,826	5,183	7,970	112.4	73.0
United States	100,829	97,856	100,172	103.0	100.1	1,165,388	1,463,914	1,511,888	2,081,048	2,614,132	2,600,507	70.6	77.1
Guatemala . .	418	347	330	120.4	120.8	3,437	2,804	2,351	6,137	5,007	4,198	122.0	146.2
Mexico . . .	7,318	7,228	7,878	101.7	93.3	20,203	33,394	49,233	52,147	50,631	87,917	87.4	50.3
Total Amer.	120,495	116,011	117,260	103.9	102.8	1,409,080	1,660,160	1,720,952	2,516,212	2,964,572	3,073,137	84.9	81.9
Syria and Leb.	105	67	120	156.4	87.8	953	1,004	1,311	1,702	1,792	2,341	95.0	72.7
* Turkey . . .	...	1,038	(4) 587	...	...	9,871	12,272	(4) 6,026	17,828	21,014	(4) 10,760	80.4	163.8
Algeria . . .	21	23	25	89.4	84.0	116	151	141	207	270	251	76.6	82.5
Kenya . . .	212	244	169	107	125.5	3,470	3,717	2,086	6,167	6,638	3,730	93.4	106.1
Fr. Morocco . .	664	600	530	110.7	123.2	2,897	3,055	3,324	5,173	5,455	5,936	94.8	87.1
Tunis . . .	37	49	43	75.5	86.0	132	143	103	236	250	184	92.3	128.2
Un. of South Africa (5)	4,371	6,200	4,935	63.5	88.6	31,906	45,014	36,540	56,475	80,383	65,250	70.9	87.3
Total Africa	5,305	7,196	5,711	73.7	92.9	38,321	52,080	42,197	68,788	93,002	75,351	74.9	91.3
Grand Total	154,621	153,110	149,990	101.0	103.1	1,789,610	2,107,453	2,070,678	3,195,131	3,763,311	3,697,645	84.9	86.4

(†) The two dates mentioned refer to the years in which the harvest took place in the northern and southern hemispheres respectively. — * Countries not included in the totals. — (1) The figures for the averages are not exactly comparable with those of the years 1930 and 1929 owing to changes in the method of making estimates. — (2) For 1930: area sown; for the preceding years: area harvested. — (3) Average 1925 to 1928. — (4) Average 1927-28. — (5) Area harvested on European farms only; production comprises also that of the natives.

contained in the grain. The Ministry of Agriculture, in view of this year's exceptionally abundant crop and the low market prices, has ordered technical agents of the Ministry of Agriculture situated in the interior of the country, to carry out active propaganda in order to advise farmers, after having harvested their maize in dry and ripe condition, to place it under cover so that the degree of humidity shall not exceed 14° at the time of transport. The railway companies, following an agreement with the Ministry of Agriculture, have allowed a reduction of freights for maize, directly proportional to the distance, and varying from 10 to 20 %.

United States : On about May 20th, maize planting was progressing very well but partial re-planting was needed due to insect pest attacks. In the following week planting was nearly completed in the principal producing areas but low temperatures were unfavourable and growth was poor. There was also considerable complaint of early fields yellowing because of the persistent coolness, and widespread reports of cutworms. The unfavourable conditions necessitated much re-planting. At the close of the week,

however, warmer weather was helpful. In the fortnight ending June 10, the crop condition of maize improved and was fairly good.

Mexico : During April preparations for sowing of "temporal" varieties were hastened throughout the country. It is considered that the area sown this year is greater than last year.

Surinam : Thanks to favourable seasonal conditions for maize, the crop harvested in the first quarter of the year was good.

Palestine : First sowing completed in Huleh ; good germination is noted. In many colonies the dry sown crop is well up.

Indo-China : The harvest has been good in Tonkin and promises well in Annam, apart from possible damage from the drought.

Basutoland : In the lowlands the late commencement of the spring rains delayed ploughing and sowings were unusually small. Allowing for damage by early frosts, it is doubtful whether increased yields in the mountain districts will to any considerable degree offset the shortage in the lowlands.

French Morocco : Appearance of maize, millet and sorghum is generally good, though late sowings have suffered from the heat.

Réunion : The cyclone at the beginning of March caused very serious damage.

Union of South Africa : The unusually heavy rains at the close of the summer came too late to be of much benefit to the late planted maize. While some damage by frost has been reported on the highveld, particularly in the Eastern Province and in the Northern Karroo, the weather has not on the whole been so severe as to cause serious loss, though development of the grain has certainly been retarded. In the Orange Free State some damage by stalkborer has been reported ; reaping had begun in April. In the Transvaal prospects were variable, much depending on the holding off of heavy winter frosts; some excellent yields were expected in the Eastern highveld areas. Crop estimates show a general downward tendency due mainly to the realisation that many stands will not mature. A considerably greater area was expected to be cut for silage than ever before, partly owing to the lateness of the crop and to the damage caused by the March drought. Native crops particularly are reported to be very poor, at least in Natal.

RICE

Bulgaria : Weather conditions during May favoured rice, the crop condition of which (by the Institute's system) on June 1 was 110 against 100 last year. The area sown this year is estimated at 14,800 acres against 18,200 last year and 18,100, the average of 1925-1929 ; percentages : 81.5 and 81.8.

Italy : Sowings have been completed and weeding has begun. In some districts resowing of early varieties damaged by frosts was being carried out at the end of May.

United States : In the week ending on about May 27 rice made fair advance in Louisiana but growth was slow in Georgia.

Surinam : Less rice than usual had been planted at the beginning of the current year and the nurseries planted at the end of February have been lost as a result of the subsequent drought.

India : In the third week of May, nearly general light to moderate rains in Bengal facilitated the sowing of paddy except in parts of certain districts in East Bengal, where the waterlogged condition of the lowlands affected operations. In the following week, rainfall was moderate to heavy ; at the beginning of June light and scattered showers had fallen and progress was being made with paddy sowings but more rain was needed.

At the end of May rice sowing had begun in the Central Provinces.

Indochina : The second estimate for Cochín-China shows a reduction on the first estimate of 11 million centals (24.5 million bushels) due to the drought and to "tiêm" (withering of the ears); production in 1930-31, 40,605,000 centals (90,231,000 bushels), is thus 15.3% cent below that of 1929-30, 47,962,000 (106,579,000) and 16.5 % below the average of the five years ending 1928-29, 48,620,000 (108,043,000).

The total crop of Indochina, 129,637,000 centals (288,076,000 bushels) is thus over 2 million centals (about 5 million bushels) below that of 1929-30, 132,084,000 centals (293,514,000 bushels) and the mean for 1924-25 to 1928-29, 131,857,000 centals (292,999,000 bushels), showing a percentage decrease with respect to these of 1.9 and 1.7. The first crop of the present season did not appear altogether favourable in March. The drought and the lack of irrigation water have hindered transplanting in Tonkin and in certain districts of Annam, with the result that the area devoted to early varieties has been reduced. Irrigation water has been deficient in certain districts and crop condition has suffered; growth was good in the irrigated fields but in North Annam the exceptionally high temperatures and the dryness of the atmosphere had already caused some damage.

Philippines : Production of rough rice in the season 1930-31 is estimated at 44,971,000 centals (99,933,000 bushels) compared with 50,041,000 (111,200,000) in 1929-30 and 47,161,000 (104,799,000), the average for the preceding five seasons; percentages: 89.9 and 95.4.

POTATOES

Germany : As far as can be at present judged early varieties are generally well up. Late varieties are showing only in the most favourably situated districts.

Austria : Early varieties are beginning to flower. Late varieties are coming up slowly and irregularly.

Belgium : A great extension of the crop is reported. Early varieties have been earthed up and their development is normal; the plant of late varieties is rather irregular.

France : There were alternations of rainy and fine weather and of low and high temperatures in May, with storms towards the end of the month. The fine warm weather with occasional showers that characterised the first half of June on the whole have favoured germination and sprouting. In the Centre the area is reported to be greater than that of last year.

Great Britain and Northern Ireland : In England and Wales acreage is somewhat larger than in 1930. Early potatoes were at the end of May generally showing satisfactory progress although in some areas they were cut by frosts. Where showing, main crop plants appeared to be healthy and even. In Northern Ireland potatoes in some backward districts have not yet been planted. In most districts the early crop is looking well. In lowlying areas the crop is rather backward.

Hungary : Potatoes have sprouted well and are growing under good conditions. The first hoeing has begun.

Italy : Plantings have been completed everywhere and the crop is promising. Harvesting of early varieties is general.

Luxemburg : In May weather was generally favourable.

Switzerland : Development was fairly regular since storm and hail damage was avoided.

U. S. S. R. : In May planting proceeded slowly and the area on 5 June was 11,503,000 acres, that is, 6% of that fixed in the Plan. Rolling and the first cultivations proceeded equally slowly.

Potatoes.

COUNTRIES	AREA					CROP CONDITION (†)											
	1931	1930	Average 1925 to 1929	% 1931													
				1930 = 100	Aver. = 100	1-VI-1931			1-V-1931			1-VI-1930					
						a)	b)	c)	a)	b)	c)	a)	b)	c)			
1,000 acres																	
Germany . . . s)	...	584	504	...	...	2.7	—	—	—	—	—	—	2.7	—	—	—	—
... t)	...	6,346	6,405	...	...	2.8	—	—	—	—	—	—	2.8	—	—	—	—
Austria . . . s)	...	67	46	...	...	2.6	—	—	—	—	—	—	2.4	—	—	—	—
... t)	...	407	406	...	...	2.7	—	—	—	—	—	—	2.5	—	—	—	—
Belgium . . . .	...	402	408	...	...	f)	—	—	—	—	—	—	d)	—	—	—	—
Bulgaria	32	35	20	92.9	122.3	150	—	—	—	—	—	—	150	—	—	—	—
Finland	174	175	172	93.9	101.0	—	—	—	—	—	—	—	—	—	—	—	—
Scotland . . . .	...	123	144	...	...	—	100	—	—	—	—	—	—	100	—	—	—
Luxemburg	40	40	40	99.1	99.3	2.4	—	—	—	—	—	—	2.3	—	—	—	—
Netherlands . . .	400	307	432	100.8	92.6	(1) 70	—	—	—	—	—	—	(1) 73	—	—	—	—
Poland . . . . .	...	6,602	6,125	...	...	3.3	—	—	—	—	—	—	3.4	—	—	—	—
Rumania . . . . .	...	468	482	...	...	c)	—	—	—	—	—	—	—	—	—	—	—
Switzerland . . .	...	120	117	...	...	—	—	99	—	—	—	—	—	—	—	93	—
Czechoslovakia . .	...	1,646	1,792	...	...	—	—	2.6	—	—	—	—	—	—	—	2.4	—
Algeria s)	20	30	25	66.7	78.5	—	f)	—	—	—	—	—	—	—	—	—	—

(†) For the explanation of signs and figures indicating crop condition, see Cereals table and note on page 307.
 — s) Early potatoes. — t) Late potatoes. — (1) Middle of month.

Mexico : In the producing regions of the Sierra de Chihuahua planting was effected under fairly good conditions following the frosts of the first part of April.

Indo-China : In Tonkin thanks to frequent rains, the crop has a good appearance.

Palestine : In Northern Palestine the crop is being lifted with good yields from all parts wherever grown. In Southern Palestine lifting has been completed, but the crop has suffered from the cold weather.

Union of South Africa : The European-grown crop is estimated to be 24 % less than in 1929-30. The chief causes of the reduced production in the highveld areas are the unremunerative returns for the previous season's crop and the droughty conditions prevalent during the latter part of last year. Extensive plantings were made subsequent to the breaking up the drought in December, particularly in the Thaba 'Nchu district the principal producing area of the Orange Free State, but the March drought and the tuber-moth, which particularly affected the same area, materially reduced original expectations. Supplies from the highveld will therefore be considerably smaller during the present winter than last year, although new potatoes from the Transvaal lowveld should be comparatively plentiful in the coming spring.

SUGAR SEASON

Germany : The young crops of sugar beet are, in general, making satisfactory progress.

Austria : In several localities resowing has occurred. Despite the intensive campaign against parasites, the invasion of insects has been such that it has been impossible to save the crop. Vegetation is thus very much in arrear and in a number of districts it has not been possible to proceed with the first cultivation.

Belgium : During May some fields of sugar beet had to be re-sown. The first beet sowings are being hoed.

Acreage of Sugar Beet.

COUNTRIES	1931 (1)	1930	Average 1925 to 1929	% 1931	
				1930 = 100	Average = 100
				Acres	%
Germany	872,129	1,157,194	1,062,529	75.0	82.0
Austria	106,000	89,000	61,846	119.0	172.0
Belgium	124,000	187,311	162,316	90.0	76.0
Bulgaria	37,000	48,789	34,622	76.0	107.0
Denmark	77,000	84,000	92,997	91.0	82.0
Spain	240,000	208,960	182,438	115.0	131.0
Irish Free State	8,200	14,889	14,211	57.0	57.0
Finland	4,900	3,090	5,296	162.0	94.0
France	620,000	679,480	583,647	91.0	106.0
Great Britain	231,000	348,364	165,415	66.0	140.0
Hungary	156,000	184,548	167,859	84.0	93.0
Italy	284,000	277,575	224,800	95.0	118.0
Latvia	7,000	5,900	—	125.0	—
Netherlands	92,000	142,196	157,114	65.0	59.0
Poland	408,000	457,000	510,179	80.0	80.0
Rumania	37,000	120,948	166,863	31.0	22.0
Sweden	85,300	96,520	77,983	86.0	109.0
Switzerland	3,600	3,040	3,657	104.0	84.0
Czechoslovakia	441,389	556,316	674,813	79.0	65.0
Turkey	19,789	11,120	19,739	178.0	100.0
Yugoslavia	120,000	147,798	110,277	84.0	112.0
<i>Total Europe . . a)</i>	<i>3,954,287</i>	<i>4,773,538</i>	<i>4,478,601</i>	<i>83.0</i>	<i>88.0</i>
U. S. S. R.	3,490,000	2,533,000	1,626,373	137.0	213.0
<i>Total Europe . . b)</i>	<i>7,444,287</i>	<i>7,306,538</i>	<i>6,104,974</i>	<i>101.0</i>	<i>121.0</i>
Canada . . . . .	...	52,511	45,854	...	...
United States . . . . .	...	800,255	681,218	...	...

a) Not including the U.S.S.R. — b) Including the U.S.S.R. — (1) Approximate data. — (2) Average 1927 to 1929.

a) Not including the U.S.S.R. — b) Including the U.S.S.R. — (1) Approximate data. — (2) Average 1927 to 1929.

Bulgaria : During the last three weeks of May abundant rains fell. The growth of sugar beet is advancing perfectly. Crop condition on June 1 by the Institute's system was 120 against 150 last year. The sugar beet area this year is estimated at 37,100 acres against 48,800 last year and 35,000, the average for 1925-1929 ; percentages : 76.0 and 106.1.

Irish Free State : Area under sugar beet has been considerably reduced.

France : Late sowings were hindered in the North by the bad weather in the second week of May. Owing to the prevalence of rainy and rather cold weather in the third week, the crop is rather irregular and singling has been hindered in the North ; a certain amount of resowing has been necessary. The good weather that set in at the end of May and persisted in the first fortnight of June despite some storms considerably improved crop condition and permitted singling to be actively continued.

Since the beginning of the season (September 1), until May 15, the sugar factories have produced 25,941,000 centals (1,297,000 short tons) of sugar or nearly $\frac{1}{3}$ more than last year (19,743,000 centals or 987,000 short tons), the percentage being 131.4.

Great Britain and Northern Ireland : In England and Wales the area under sugar-beet is appreciably less than last year. Sowing was late and in many areas the plants were not showing at the end of May.

Hungary : Animal parasites have seriously damaged the beet. In various districts, re-sowing was necessary. The first hoeing is in progress.

Italy : Growth improved during May and conditions are now moderately good. Cultivation is proceeding actively.

Netherlands : The production of sugar during the season 1930-31 is estimated at 6,359,000 centals (318,000 short tons), against 5,686,000 (284,000) in the previous season and 6,477,000 (324,000), on the average for 1924-25 to 1928-29 (percentages : 111.8 and 98.2).

U. S. S. R. : On 5 June only 3.2 % of the area planned had still to be sown. Weather conditions in May were not very favourable to preliminary field work, which proceeded slowly, especially on the individual agricultural holdings.

United States : In the week ending May 27 sugar beets were injured locally by frost in the Rocky Mountain region but, in general, were doing well.

On about May 27 sugar cane was backward in Louisiana.

Virgin Islands : Production of cane sugar in 1930-31 in the American Virgin Islands according to an unofficial estimate published by the United States Department of Agriculture is 40,000 centals (2,000 short tons) compared with 128,500 (6,400) in 1929-30 and 145,000 (7,300), the average of the preceding five seasons, the respective decreases being 68.9 % and 72.4 %.

Mexico : Cutting of sugar cane in the principal producing areas has been effected under favourable conditions and yields are rather good. It is estimated that production this year will exceed that of last year by 10 %.

Porto Rico : According to an estimate published by the United States Department of Agriculture production of cane sugar in 1930-31 in Porto Rico, is 15,660,000 centals (783,000 short tons) compared with 17,320,000 (866,000) in 1929-30 and 12,897,000 (645,000), the five year average of 1924-25 to 1928-29 ; percentages : 90.4 and 121.4.

Surinam : Production of sugar cane in the first quarter was higher this year than in the same period of last year but forecasts are not altogether favourable due to inadequate rainfall.

Sugar Beet.

COUNTRIES	CROP CONDITION (†)								
	1st June, 1931			1st Mai, 1931			1st June, 1930		
	a)	b)	c)	a)	b)	c)	a)	b)	c)
Germany.	2.8	—	—	—	—	—	2.8	—	—
Austria	—	—	3.2	—	—	—	—	—	3.1
Belgium	—	f)	—	—	—	—	d)	—	—
Czechoslovakia	—	—	29	—	—	—	—	—	2.8
Rumania	—	100	—	—	—	—	—	—	—
Switzerland	—	100	—	—	—	—	—	—	—
Netherlands	—	(1) 63	—	—	—	—	(1) 65	—	—
Poland	—	3.0	—	—	—	—	3.5	—	—

(†) For the explanation of signs and figures indicating crop condition, see cereals table and note on page 307.

(1) Middle of month.

India : Light rains fell at the beginning of May in the Punjab were followed at the middle of the month by general rainfall and some hailstorms. The latter half of the month was dry apart from light rainfall at the end of the month in parts of all districts and condition was average to good. In the United Provinces light scattered rains fell during the month together with some hailstorms. In Bihar and Orissa sugar cane was in good condition at the beginning of June.

Indochina : In Tonkin yields of cane have varied from 134 to 161 centals per acre. (7.8 short tons per acre) ; the average yield of molasses was 1 lb. from each 12 lbs. of cane.

Java : The 1931 season has begun late. Production will be at about the same level as in 1930, although at present it seems to be a little lower. Yield of sugar is, at present, also low, due perhaps to the rains which continued into the latter half of May.

Philippines: Production of sugar and panochas is estimated as follows: 1930-31: sugar 18,796,000 centals (940,000 short tons); panochas 862,000 centals (43,100 short tons); 1929-30: sugar: 18,885,000 (944,000); panochas, 790,000 (39,500); average 1924-25 to 1928-29: sugar 14,791,000 (740,000); panochas: 795,000 (39,800). Percentages: sugar: 99.5 and 127.1; panochas: 109.1 and 108.4.

Egypt: Weather has been favourable to planting, shooting, and growth, despite occasional storms. Cultivation is finished in Upper Egypt and almost so in Lower Egypt. Manuring in general still proceeds as well as hoeing, manuring and irrigation of early crops. Crop condition on 1 June was 100, as on 1 May 1931 and on 1 June 1930. Cutting of the old crop ended in April and grinding was completed in the first half of the month. Production was 2,685,000 centals (134,300 short tons) raw sugar, against 2,363,000 (118,200) in 1929-30 and 1,974,000 (98,700), the average of the five years ending 1928-29, the percentages with respect to these figures being 113.6 and 136.0.

Mauritius: After the great cyclone of March the production of sugar in 1931-32, which was forecast at 5,401,000 centals (270,000 short tons), is now estimated at 4,167,000 (208,000) against 4,871,000 (244,000) in 1930-31 and 5,041,000 (252,000), the average for the preceding five years. Percentages: 85.0 and 83.0.

Union of South Africa: The coastal belt of Natal had a particularly good rainfall in March and April and sugar-cane was looking very well at the end of the latter month, though in some parts of the Lower Umfolozi district it was stunted.

VINES

WINE MARKET SITUATION IN THE FIRST MONTHS OF THE 1930-31 SEASON.

With the viticultural season half over in the northern hemisphere the general features of the trade in wines during the first half of the season may be examined and, on the basis of the present situation, market tendencies in the remaining half of the season delineated.

TABLE I. — *Exports of wine from the principal producing countries.*

VITICULTURAL SEASON	1930-31	1929-30	1928-29	1927-28	1926-27	1925-26
(thousands of Imperial gallons)						
Spain: 1 October-31 March (6 months)	63,221	38,144	56,534	52,508	44,875	33,854
Italy: 1 October-31 March (6 months)	16,102	11,241	11,417	13,858	13,089	14,562
France: 1 October-31 March (6 months)	8,997	14,430	15,420	16,388	19,292	20,084
Portugal: 1 October-30 April (7 months) (1) . .	10,317	11,923	—	—	—	—
Hungary: 1 October-31 March (6 months) . . .	4,773	4,707	3,234	1,188	1,254	660
Yugoslavia: 1 October-31 March (6 months) . .	2,640	660	770	1,254	572	220
Greece: 1 October-28 February (5 months) . .	7,743	15,112	17,246	9,723	14,694	9,525
Australia: 1 July-31 March (9 months) (2) . .	1,626	1,939	1,701	1,676	1,128	623
(thousands of American gallons)						
Spain: 1 October-31 March (6 months)	75,923	45,807	67,892	63,058	53,891	40,856
Italy: 1 October-31 March (6 months)	19,837	13,499	13,710	16,643	15,718	17,488
France: 1 October-31 March (6 months)	10,805	17,330	18,518	19,681	23,168	24,119
Portugal: 1 October-30 April (7 months) (1) . .	12,390	14,318	—	—	—	—
Hungary: 1 October-31 March (6 months) . . .	5,733	5,658	3,883	1,427	1,506	793
Yugoslavia: 1 October-31 March (6 months) . .	3,170	793	925	1,506	687	264
Greece: 1 October-28 February (5 months) . .	9,299	18,149	20,711	11,676	17,647	11,439
Australia: 1 July-31 March (9 months) (2) . .	1,953	2,829	2,043	2,012	1,355	743

(1) Data for the preceding years are not available; exports for the year (January-December) in thousands of Imperial gallons: 1930: 17,928, 1929: 20,788, 1928: 28,839, 1927: 16,960, 1926: 20,370, 1925: 22,325; American gallons: 1930: 21,530, 1929: 24,964, 1928: 34,633, 1927: 20,368, 1926: 24,462, 1925: 27,051. — (2) Imports of Australian wines into Great Britain represent about 90% of the total exports of Australia.

The following table gives an exact idea of the trend of European exports, as it covers 98 % of the total. Imports of Australian wines into Great Britain have also been indicated, since these give an idea of the trade of the most important exporter of the southern hemisphere.

The considerable decrease in Greek exports is due to the quite exceptional smallness of the crop and corresponds to our forecast of January. The continued, and this year particularly marked, reduction in France is due in part to the relative dearness of that country's wines on the international market and partly to the economic crisis, which has especially affected superior wines. The latter reason would equally explain the decrease in exports of Portuguese wines, particularly those of Oporto and Madeira. In Europe outside these countries there is, on the contrary, a revival of exports, particularly accentuated in Spain, that has continued since the beginning of the season. This development is due to a general cause, the fall in wine prices in these countries to a level never previously reached in any year since the War. In addition the French market has this year offered an exceptional outlet, partly owing to the pooriness of the 1930 harvest, but mainly to the relatively very high prices of national wines as compared with those of other countries. The Danube countries have further accentuated this disequilibrium, already favourable to the marketing of their wines, by awarding bounties on export. There is a notable increase in exports from Jugoslavia; those of Hungary have, however, been checked and appear to have attained their maximum.

The characteristics of the European import situation may be seen from the following table, which covers 97 % of European imports and about 80 % of world imports, those of Algeria to France excluded.

It will be clearly seen that almost the sole factor in the revival of exports above-noted is the French market. Though there has been, indeed, a very slight increase in imports into Switzerland, which may, however, disappear in the course of the next six months, there has in all the other countries been a more or less marked regression, accentuated this year in Central Europe by the abundance of the harvest. Thus in Czechoslovakia, although a slight increase in internal consumption is reported, there has been a marked decrease in imports. It must be noted also that this country is supplied increasingly on the Hungarian market; in 1927 imports from Hungary accounted for scarcely 1 % of the total, but in 1930 they represented 30 %. In Germany there was a decline in internal consumption, attributed to internal taxes, particularly the local consumption taxes; the decrease in imports is, however, far from accounted for by the surplus of the last crop, and they seem to have attained their minimum.

One of the most striking features of the European trade in wine is the orientation of the British market toward the Dominions, Australia and South Africa.

Source of imports into Great Britain 1 November-30 April.

Season		1930-31	1929-30	1928-29	1927-28	1926-27	1925-26
British Empire	(ooo Imp. gall.)	1,857	1,872	1,411	1,372	1,638	749
	(ooo Amer. gall.)	2,230	2,248	1,694	1,628	1,967	899
Other countries	(ooo Imp. gall.)	6,273	7,021	6,126	6,119	10,258	8,412
	(ooo Amer. gall.)	2,533	8,422	7,357	7,352	12,319	10,103
includ. Portugal	(ooo Imp. gall.)	2,968	3,467	2,821	2,621	4,880	4,200
	(ooo Amer. gall.)	3,564	4,164	3,388	3,148	5,860	5,044

Thus the decrease in imports this year has only to a very small degree affected Empire wines, of which the imports show an increase of 13.3 % on the corresponding six months

TABLE II. — Imports of wine in the European countries.

VITICULTURAL SEASON	1930-31	1929-30	1928-29	1927-28	1926-27	1925-26
Thousand of Imperial gallons.						
France (from countries other than Algeria):						
1 October-31 March (6 months)	54,400	31,040	50,858	41,355	24,780	25,473
1 April-30 September (6 months)	—	(17,086)	(25,825)	(57,194)	(47,330)	(16,344)
Great-Britain and Northern Ireland:						
1 November-30 April (6 months)	8,130	8,893	7,537	7,491	11,896	9,161
1 May-31 October (6 months)	—	(5,128)	(6,866)	(6,187)	(5,626)	(7,243)
Belgium:						
1 November-30 April (6 months)	4,553	4,861	4,971	4,949	6,423	7,435
1 May-31 October (6 months)	—	(4,268)	(4,729)	(4,202)	(3,938)	(6,621)
Netherlands, Denmark, Sweden, Norway:						
1 November-31 March (5 months)	2,706	2,892	2,684	2,640	3,168	3,146
1 April-31 October (7 months)	—	(4,026)	(4,004)	(3,030)	(3,344)	(4,356)
Switzerland:						
1 November-30 April (6 months)	14,034	13,902	15,574	16,388	16,938	17,202
1 May-31 October (6 months)	—	(18,550)	(10,163)	(10,845)	(9,591)	(14,804)
Germany:						
1 November-30 April (6 months)	9,890	11,268	15,286	17,664	17,406	4,422
1 May-31 October (6 months)	—	(7,875)	(11,131)	(12,825)	(11,483)	(7,545)
Austria:						
1 November-31 March (5 months)	3,806	5,301	4,905	6,423	4,048	—
1 April-31 October (7 months)	—	(3,718)	(4,223)	(4,751)	(3,894)	—
Czechoslovakia:						
1 November-30 April (6 months)	2,442	4,795	3,850	4,070	2,926	—
1 May-31 October (6 months)	—	(2,332)	(1,606)	(2,704)	(2,530)	—
Poland:						
1 November-30 April (6 months)	418	506	528	638	418	—
1 May-31 October (6 months)	—	(374)	(506)	(4,8)	(440)	—
Total first six months of season (1)						
Including France	100,338	84,343	106,173	101,618	88,052	—
Excluding France	45,998	52,403	55,315	60,263	63,233	—
Thousand of American gallons.						
France (from countries other than Algeria):						
1 October-31 March (6 months)	65,329	38,358	61,076	49,664	29,746	30,617
1 April-30 September (6 months)	—	(21,239)	(31,014)	(68,684)	(56,850)	(19,628)
Great-Britain:						
1 November-30 April (6 months)	9,763	10,680	9,051	8,996	14,286	11,002
1 May-31 October (6 months)	—	(6,152)	(8,245)	(7,430)	(6,756)	(8,698)
Belgium:						
1 November-30 April (6 months)	5,468	5,838	5,970	5,944	7,714	(8,929)
1 May-31 October (6 months)	—	(5,125)	(5,680)	(5,046)	(4,729)	(7,962)
Netherlands, Denmark, Sweden, Norway:						
1 November-31 March (5 months)	3,249	3,461	3,223	3,170	3,804	3,778
1 April-31 October (7 months)	—	(4,834)	(4,808)	(4,356)	(4,015)	(5,281)
Switzerland:						
1 November-30 April (6 months)	16,854	16,696	18,703	19,681	20,341	20,668
1 May-31 October (6 months)	—	(6,273)	(12,205)	(13,024)	(11,518)	(17,779)
Germany:						
1 November-30 April (6 months)	11,888	13,526	18,333	21,213	20,975	5,310
1 May-31 October (6 months)	—	(9,457)	(13,367)	(15,401)	(13,790)	(9,061)
Austria:						
1 November-31 March (5 months)	4,570	6,367	5,891	7,714	4,861	—
1 May-31 October (7 months)	—	(4,464)	(5,072)	(5,706)	(4,676)	—
Czechoslovakia:						
1 November-30 April (6 months)	2,932	5,759	4,923	4,887	3,513	—
1 May-31 October (6 months)	—	(2,800)	(1,928)	(3,355)	(3,038)	—
Poland:						
1 November-30 April (6 months)	502	608	634	766	502	—
1 May-31 October (6 months)	—	(449)	(608)	(502)	(528)	—
Total first six months of season (1):						
Including France	120,555	101,293	127,504	122,035	105,742	—
Excluding France	55,226	62,935	66,428	72,371	75,996	—

(1) For Austria, Netherlands, Sweden, Denmark, and Norway, five months only.

of 1928-29 and 1927-28 and of 14 % on the average for 1925-26 to 1928-29; on the other hand, the decrease in imports of foreign wines with respect to the six months period in 1929-30 is 10 % and they are hardly more than 2.5 % above those of 1928-29 and 1927-28 and 22.8 % below the average for 1925-26 to 1928-29.

On the whole, therefore, in Europe and particularly in the non-producing countries the beginning of the present season has not brought a check to the decline in consumption, which has even been accentuated in some countries. Any amelioration of market conditions has been due only in small measure to the relatively low prices of wines and ra-

ther more to the exceptional demands of the French trade. It is, therefore, the special situation and future prospects of this market that must be studied in detail to obtain a better grasp of the situation and possibilities of the world market.

TABLE III. — France. — *Supply and consumption of wine.*

VITICULTURAL SEASON	1930-31	1929-30	1928-29	1927-28	1926-27	1925-26
(thousands of Imperial gallons)						
Stocks in growers' hands on 1 October . . .	1,080,216	1,502,285	1,319,545	1,123,965	970,444	1,485,869
Commercial stocks on 1 October . . .	273,210	242,083	199,496	197,120	201,300	259,175
Quantities disposed of by growers, 1 October-31 March . . .	359,704	498,647	473,409	485,640	528,029	564,655
Total imports 1 October-31 March . . .	148,627	141,444	166,895	135,989	120,987	126,880
Taxed consumption 1 October-31 March . . .	500,026	522,244	481,240	480,668	529,349	571,540
Stocks in growers' hands on 1 April (1) . . .	480,959	597,167	506,736	339,730	216,170	547,607
Commercial stocks on 1 April . . .	276,707	269,624	254,400	256,535	264,345	277,873
Quantities disposed of by growers, 1 April-30 September . . .	—	461,091	385,529	305,194	175,035	474,443
Imports 1 April-30 September :						
from Algeria	110,000 - 130,000	90,322	95,051	56,930	59,547	103,388
from other countries	—	17,686	25,825	57,194	47,339	16,344
Taxed consumption 1 April-30 September . . .	—	575,610	534,474	500,086	445,340	602,711
Stocks in growers' hands on 30 September . . .	—	136,077	118,587	34,536	41,135	73,208
Commercial stocks on 30 September . . .	—	273,210	242,083	199,496	197,120	201,300
(thousands of American gallons)						
Stocks in growers' hands on 1 October . . .	1,273,224	1,804,049	1,584,855	1,349,781	1,165,416	1,784,895
Commercial stocks on 1 October . . .	328,100	290,720	239,577	230,723	241,743	311,246
Quantities disposed of by growers, 1 October-31 March . . .	431,972	592,826	568,522	583,210	634,116	678,100
Total imports 1 October-31 March . . .	178,365	169,862	200,426	163,310	145,294	152,347
Taxed consumption 1 October-31 March . . .	600,487	627,168	577,926	577,240	635,701	686,869
Stocks in growers' hands on 1 April (1) . . .	553,570	717,144	608,544	407,985	259,001	637,627
Commercial stocks on 1 April . . .	332,306	323,704	305,619	308,076	317,454	333,701
Quantities disposed of by growers 1 April-30 September . . .	—	553,728	462,986	366,511	210,201	569,764
Imports 1 April-30 September :						
from Algeria	130,000 - 160,000	108,460	114,148	68,367	71,511	124,160
from other countries	—	21,239	31,014	68,684	56,850	19,628
Taxed consumption 1 April-30 September . . .	—	691,256	641,856	601,279	534,814	723,802
Stocks in growers' hands on 30 September . . .	—	163,416	142,388	41,475	49,400	87,916
Commercial stocks on 30 September . . .	—	328,100	290,720	239,576	236,723	241,743

(1) Quantities available for trade, free family consumption deducted.

The table given above demonstrates the exceptionally strong part played by imports in the French supply situation in the current season ; this phenomenon is due to the difference of prices in France and other producing countries more than to the poorness of the crop. The 1926-27 season began, in fact, with supplies smaller by 88 million Imperial gallons (106 million American gallons) and imports were very low. Owing to this fact sales by growers have been abnormally low this year ; they represent the same proportion of initial stocks as last year, which is abnormal when the crops are very different in amount. Taxed consumption has maintained a fairly high level, but has not attained that of 1926-27, when initial stocks were 121 million Imperial gallons (145 million American gallons) smaller. If the trade situation for the six months of the season still to come is now considered it will be seen that the quantities available on growers' hands for delivery on 1 April — untaxed consumption being calculated for this year at approximately 240 million Imperial gallons (288 million American gallons) — though smaller than those of the last two years, are still fairly high ; the quantity that, in comparison with previous years, would be wanting for the needs of trade may be easily found in internal supplies : stocks in growers' hands may at the end of the season be reduced to less than 40 million Imperial gallons (50 million American gallons) and it is

possible to abstract 65 to 90 million Imperial gallons (80 to 110 million American gallons) from commercial stocks, which would in this case remain at the end of the season at the normal total of 190 million Imperial gallons (220 million American gallons).

The trade therefore had at its disposal 500 million Imperial gallons (600 million American gallons) of available home supplies. Further, there still remains in Algeria a quantity available for export of 110-130 million Imperial gallons (130-160 million American gallons) of wines, which are marketed relatively easily owing to their lower price. Total supplies consequently amount to 610-630 million Imperial gallons (730-760 million American gallons), which certainly exceed requirements for consumption; even if the latter followed the same tendency as last year during the end of the season, as the figures for April seemed to indicate would be the case, it could hardly exceed 550 million Imperial gallons (660 American gallons). Thus the French trade can obtain adequate supplies until the end of the season without having recourse to foreign sources. The raising of customs duties effected a month ago will encourage this tendency. It is possible, however, that these duties have no great influence in the case of certain wines due to their low prices at the place of production and also to bonuses paid on export in the country of origin; as they are sold, moreover, under marks indicating their origin, in accordance with the Finance Act of 4 January 1930, some of them have gained a more important position on the French market; lastly, there exists, in the case of Italy and Greece a quota of wine that benefits from reduced duties. It may therefore be relied upon, that, if prices of French wines retain, as it seems they will, their present firmness, the position taken on the French market by foreign wines will be partly maintained. In any case, there is reason to anticipate some diminution of end-of-season stocks in France, a diminution which may be of 65-90 million Imperial gallons (80-110 million American gallons) in comparison with last year and of 45-65 million Imperial gallons (50-80 million American gallons) in comparison with October 1929. Despite this there will still remain, however, an important surplus of quantities in producers' hands over the quantities on the market, perhaps amounting all together to about 320-340 million Imperial gallons (380-410 million American gallons).

An examination may now be made of the situation existing in the other producing countries. In Italy, market supplies began to be exhausted; there would still remain, in the hands of producers, in the North about 40 % to 50 % of the crop, while the wines of the South were mostly marketed; it may be estimated that as shipments abroad to a certain extent compensated for the restriction of home consumption and as the low level of production in 1930 counterbalanced the abundance of stocks residual from previous seasons, the present season will end with normal stocks and in any case will leave a surplus considerably smaller than that of last season.

In Spain, this absorption of supplies will be still more complete; there is already relatively little wine left in producers' hands and despite a certain diminution of shipments to France, it is very probable that the quantities to be carried over to the coming season will be somewhat reduced.

In Greece, it seems that this surplus at the end of the season will be very small if not non-existent.

For all the producing countries of Central and Eastern Europe, there may, on the contrary, be anticipated an increase in stocks due to the abundance of the previous crop which will not, however, be compensated for by a slightly greater intensity in some countries, of placements on the home and foreign markets.

With reference to North Africa, the abundant crop of this region will probably be marketed in France from now until the end of the season in a normal manner.

The current season therefore seems, despite the general calm on the markets, to

bring with it, in the northern hemisphere, an improvement in the wine trade situation in the form of a diminution of total stocks, which will be larger than was anticipated. As this improvement is due essentially to the low level of total production, and secondarily, to the very low level of market quotations, it is not of a lasting character particularly because consumption, on the whole, continues its tendency to decrease.

In the southern hemisphere, the crisis has been accentuated during the course of last season (1 May 1930–30 April 1931).

In Argentina, it is officially estimated that, on 1 May 1931, there remained in the single State of San Juan, a surplus of 24,932,000 Imperial gallons (29,941,000 American gallons) almost sufficient in itself to ensure satisfying the needs of the wine trade of this State during the current season, with the expectation of an imminent and relatively abundant crop. In Brazil, the Government has taken steps to alleviate the crisis, which the heavy crop of this spring cannot fail to produce. Lastly, in Australia, even if there is no reason to talk of a crisis, the demands of the English market, which absorbs about 90 % of the Australian exports, are diminishing and new outlets are being sought.

In the Union of South Africa, the growth of exports, which has accelerated in the last three years, has in the first six months of the present season July 1–June 30 shown a considerable regression. During the first four months of the year imports of South African wine into England have been as follows: 71,000 Imp. gallons (85,000 Amer. gallons) in 1927, 81,000 (97,000) in 1928, 118,000 (142,000) in 1929, 245,000 (294,000) in 1930 and 270,000 (324,000) in 1931; the increase from 1930 to 1931 is 10 % while in the first six months of the season July 1–December 31, it was nearly 15 % larger than in the same period of the preceding year. In the first ten months 1st July to 30th April exports increased from 453,000 Imperial gallons (544,000) in 1929–30 to 520,000 (624,000) in 1930–31. From the fiscal year 1926–27 to that of 1929–30 (July 1–June 30) the total wine exports of the Union of South Africa more than doubled, passing from 285,000 Imp. gallons (342,000 American gallons) to 618,000 (742,000).

F. d. V.

* * *

The vine situation is, on the whole, satisfactory. The outstanding fact is that frost damage is limited to Spain; in Central Europe, the vines have not suffered winter damage. Until May 15, however, rainy, cold weather somewhat retarded growth everywhere in Europe; fruit formation in France and Italy is rather poorer than the normal, whereas in other countries it is generally normal. The latter half of May and the beginning of June were, on the contrary, favourable, and flowering generally took place under good conditions, both in southern Europe and in North Africa. The appearance of vines on June 1 permits the forecast of average crops in Spain, France and Italy, and good and sometimes excellent crops in Yugoslavia, Bulgaria, North Africa and perhaps also in central Europe as far as the backward state of the season allows. The appearance of cryptogamic disease has, until now, been very limited, although the weather has encouraged its development; treatment seems to have been applied with particular intensity, although the weather was not always propitious.

Areas cultivated are being considerably extended in North Africa and Bulgaria.

Germany: Due to the prolongation of the winter, vegetation has been retarded. However, thanks to the warm wet weather of May the delay has been made up fairly well. Budding has generally proceeded satisfactorily and is good. So far no frost damage has been reported.

Austria: Development is satisfactory and the delay of preceding months has been completely overtaken.

Vines

COUNTRIES	AREA					CROP CONDITION (†)								
	1931	1930	Average 1925 to 1929	% 1931										
				1930	Aver. 1925-29	1-VI-1931			1-V-1931			1-VI-1930		
						1,000 acres			100			100		
						a)	b)	c)	a)	b)	c)	a)	b)	c)
Germany . . . . .	...	203	201	...	...	2.0	—	—	—	—	—	2.3	—	—
Austria s)	...	77	80	...	...	1.9	—	—	2.3	—	—	2.4	—	—
Bulgaria	217	205	189	106.0	114.8	150	—	—	150	—	—	150	—	—
Luxembourg	3	3	4	100.0	84.5	2.2	—	—	—	—	3.2	—	3.0	—
Switzerland . . . . .	...	35	35	...	...	—	—	91	—	—	—	—	—	83
Algeria { s)	608	601	528	101.1	115.2	e)	—	—	e)	—	—	e)	—	—
French Morocco t)	697	671	595	103.9	117.0	e)	—	—	e)	—	—	e)	—	—
Tunis	27	18	15	152.5	187.0	e)	—	—	—	—	—	—	—	—
	98	87	74	113.1	133.5	125	—	—	100	—	—	100	—	—

(†) For the explanation of signs and figures indicating crop condition, see Cereals table and note on page 307 —
s) Area bearing. — t) Total area. — (t) Average 1926, 1928 and 1929.

France: The frosts have caused on the whole only slight damage to vines in the Rhône valley, Provence and some parts of Burgundy; all the other regions have been nearly free from damage. May was not on the whole favourable to vines; there were too few warm and sunny days. Cold and rainy weather checked growth to some extent; fruit formation was, on the whole, poor and much below that of last year; the shoots are, in general, not very strong. The first days of June, bringing warmth and sunshine, greatly improved the situation, especially in the South and in the Southwest. Flowering began under very good conditions, although it was retarded by rain towards the end of the first week. Fine weather set in afterwards and the second week was very favourable. Local but in some cases grave damage is reported this year. Rainy and cold weather, alternating, at the beginning of June, with warmth and dampness, were very favourable to the development of cryptogamic disease. Thanks, however, to energetic treatments applied everywhere as soon as the weather permitted, the few traces, of mildew and *oidium* which were reported in the South and Southwest, seem to have disappeared. Fudemis is not very prevalent this year. Towards June 8 the general condition of vines was fairly good. The situation was the most favourable in the South, especially in Roussillon and in the Southeast; in the Southwest, Languedoc, Gascogne and Bordelais, the situation, although satisfactory, is a little less good due to the greater backwardness of growth; similar conditions exist in the West and Centre; in the East and Burgundy, growth was fairly good although there was some damage by hail; fruit formation was fairly satisfactory. Excepting unforeseen adversities an average production may be counted upon.

Hungary: At the end of May, the development of vines was generally satisfactory. In the viticultural area of Szekeszarad hailstorms during May caused considerable damage. Seasonal operations of cultivation are proceeding regularly. Some occasional damage by animal parasites is reported. Brisk offers of wine meet only weak response.

Italy: Flowering has begun. Anti-cryptogamic treatment has been actively prosecuted.

Rumania: At the end of May crop condition was satisfactory.

Switzerland: Under the influence of warmth and frequent showers, the vines have developed with unusual rapidity and regularity; as far as may be judged at present, the formation of fruit is largely satisfactory.

Palestine : Crop condition as at 1st June was average to poor ; flowering took place under average conditions.

Turkey : In the first week of June a very violent south wind continued to blow in the Smyrna region. It is feared that this wind, which brings marked heat waves will have harmful effects on the vines.

Algeria : Despite the drought, the condition of vines was satisfactory, the amount of precipitation since September having been above the mean and the soil having a good reserve of moisture. Their appearance was good ; flowering took place under good conditions but the sirocco winds which followed caused considerable dropping of flowers in some districts. Attacks of *Eudemis* seem to be intense in some vineyards ; an attack of mildew, the extent of which is feeble, has occurred as a result of damp nights and mists at the end of May. Despite these circumstances the conditions of vines on June 1 and the number and size of the grapes give hope of average yields or yields at least equal to those of last year.

Cyrenaica : Vines have flowered under nearly normal conditions and the plants have suffered only limited damage.

French Morocco : Growth of the vines and the formation of fruit are satisfactory.

Tripolitania : Vines have flowered under good conditions. Crop condition on May 1 was good.

Tunis : Vines have flowered under good conditions. In the North, where practically all the vineyards are situated, the winter rains stored in the soil, will permit wines to grow under good conditions during the summer.

OLIVES

Italy : Flowering has been regular and good fruiting is expected.

Palestine : Crop condition as at 1st June was average ; flowering took place under average conditions.

Algeria : Olives have flowered abundantly but, due to an abrupt rise in temperature at the end of the month and to the prolonged drought, the formation of fruit has not been altogether satisfactory. Crop condition on 1 June was in consequence less satisfactory than on 1 May, being 95 instead of 100. On 1 June 1930 it was 100.

Cyrenaica : Flowering of olives has been somewhat hindered by hot spring winds.

French Morocco : Condition of olives on June 1, 1931 was good whereas on May 1, 1930 it was only average. Flowering has been good. Olive plantations at the beginning of 1931, that is, the end of the oil season 1930-31, had 5 ½ million trees in bearing, or 9 % more than the number of trees picked in the season 1929-30 (5,047,052) and 35.7 % above the average for the preceding five seasons. The extension of cultivated plantations has therefore continued.

Tripolitania : Olives have flowered under good conditions. Crop condition on May 1 was good.

Tunisia : Flowering took place under good conditions. At the moment crop condition is considered good and reckoned as 100. If, however, in the North the reserves of soil moisture ought to permit vegetation to proceed under good conditions, in the Centre and South they are scarcely sufficient for the summer needs of the trees. Of the trees in bearing 70 % are in the latter regions.

COTTON

Bulgaria : During the last three weeks of May, abundant rains fell. Crop condition of cotton on June 1 (by the Institute's system) was 125 against 100 last year. The area sown to cotton this year is estimated at 16,100 acres, or 18.5 % larger than that of last year and 47.8 % above the average for 1925-1929.

Italy : In the province of Caltanissetta germination is satisfactory.

U. S. S. R. : Despite unfavourable weather sowings began 20 days in advance of last year owing to the recommendation of the Government that they should be completed by 10 May. They have however, been prolonged up to the beginning of June. The area sown on 5 June was 6,128,090 acres, 107.8 of that planned and over 50 % above that of last year. Collectivisation had on 20 May included about 50 % of all holdings. The first cultivation for cotton was carried out under unsatisfactory conditions.

United States : In the week ending May 20th, although temperatures improved, the growth of cotton was poor. In the following week temperatures were too cool (6° - 10° F. below normal over much of the belt) and the soil was unfavourably wet in the north-eastern and northwestern section although the weather became warmer at the end of the week. Some progress was made in Southern Carolina and Florida, and field work advanced in Texas and Georgia. On about June 3 the crop condition of cotton was moderate and in the following week temperatures further improved.

The revised estimates of area and production of cotton in 1930-31 are as follows : area 45,091,000 acres compared with 45,793,000 in 1929-30 and 43,997,000, the average of 1924-25 to 1928-29; percentages : 98.5 and 102.5. Production : 66,595,000 centals (13,932,000 bales) compared with 70,878,000 (14,828,000) in 1929-30 and the average of 71,826,000 (15,028,000) ; percentages : 94.0 and 92.7.

Mexico : In the producing regions of the Comarca della Laguna sowings were completed. The frosts of the first half of April caused some damage and re-sowing was necessary. In the valley of Juarez sowings began in favourable conditions. In the Vera Cruz district the crop was average.

India : Cotton planting has been nearly completed along the Deccan canals and is proceeding in Jamrao.

Indo-China : The crop has been good on the whole, with fairly high yields, though in some areas the bushes have suffered from the drought.

French West Africa : The crop in the French Sudan shows a slight increase on that of last year. The diffusion of the Allen variety continues : this year it will probably produce 38,800 centals (8,100 bales) of fibre. The establishment of a spinning and weaving mill at Kayes should stimulate still further development of cotton growing.

Algeria : Due to unfavourable sale prices of cotton, cultivation of this crop is in regression. As 3,700 acres have been sown as compared with 14,200 in 1930 and 25,000, the mean of the five preceding years. Percentages : 29.2 % and 24.6 %. It is possible, however, that the figure given for this year may still be modified. The aspect of the plantations was good on June 1st despite the drought.

Egypt : The weather varied greatly in the first half of May with cool days, sunny for the time of year, heavy dews, cold and very violent winds and showers at Asyût and El Minya, which, however, was not detrimental to the growth of the plants ; later an improvement took place with a change to more uniform and hot weather ; in general, it may be said that such conditions have not been very favourable to the crops. Plants are in good condition but late crops are about ten days backward in growth. Not much re-sowing has been necessary and those re-sown look well. Flowering is somewhat in delay. Damage by insects and moisture have, until now, been insignificant. This year, the level of the Nile is below the normal. Irrigation water has been generally sufficient, except at the extremities of the canals. — (Telegram of June 1) : The third estimate of production of cotton in the season 1930-1931, based on ginning results from September 1, 1930 to April 30, 1931 and on statistics of the quantity of unginned cotton lying in the ginning factories and in the provinces, gives the following quantities of ginned cotton (excluding linters) : Sakellariadis : 2,051,000 centals (429,000 bales) ; all other

varieties: 5,888,000 (1,232,000); total: 7,939,000 (1,661,000). In comparison with the final estimate for 1929-30 (8,450,000 centals or 1,768,000 bales) and with the average production of the five seasons 1924-25 to 1928-29 (7,339,000 centals or 1,535,000 bales), the percentage relations are 94.0 and 108.2. According to the third estimate for the seasons 1928-29 and 1929-30, production of the Sakellaridis variety were 2,509,000 centals (525,000 bales) and 2,670,000 (559,000) respectively. (Telegram of 16 June): From the beginning of the ginning campaign on 1 September 1930 to 31 May 1931 the following quantities of ginned cotton have been obtained in Egypt as a whole, compared with the results on 30 April 1 and on 31 March of the current season.

Season		31 May	30 April	31 March
			(thousands)	
Sakellaridis	cent.	1,664	1,595	1,558
	bales	348	334	326
Other varieties	cent.	5,271	4,849	4,619
	bales	1,103	1,014	966
Total	cent.	6,935	6,444	6,177
	bales	1,451	1,348	1,292
Linters	cent.	161	151	149
	bales	34	32	31

Nigeria: Yields per acre of American cotton this year in the Northern Provinces have been considerably below the average due to unfavourable distribution of rainfall. The area cultivated was also below the average. It is estimated that if prices had been normal about 100,000 centals (21,000 bales) of American ginned cotton would have been purchased for export during the current season; quotations, on the contrary, have fallen to an extremely low level and have brought a large reduction in purchases, which, at the end of March (approximate date of the end of the cotton season) barely reached 57,000 centals (11,800 bales), the lowest figure recorded in the last eight years. It is considered, however, that considerable quantities of cotton have been exported directly from the Province of Sokoto to French territory and consequently do not figure in the railway transport statistics. The cultivation of ordinary native cotton has been almost completely abandoned (192 centals or 40 bales had been sold up to the end of March against 14,000 (2,900) in the season 1929-30) and has been replaced by the "Improved Ishan" variety; purchases of this variety of cotton have also been much lower than last year (8,300 centals or 1,750 bales up to the end of March, against 24,000 centals or 5,000 bales in 1929-30), due to low prices. It seems that yields per acre have also been considerably below those obtained in preceding years, but if prices had been maintained at a normal level it would have been possible to rely upon purchases totalling at least 40,000 centals (8,400 bales).

Total purchases of ginned cotton of all varieties had attained at the end of March hardly 65,000 centals (13,600 bales). As the cotton season may be considered to end at this date, it is evident that the 1930-31 season shows a very large reduction of exports compared with the preceding season (176,000 centals or 38,000 bales) and also compared with the average of the preceding five seasons.

Uganda: According to reports that have reached the Department of Agriculture the quantity of ginned cotton arriving in the market up to the end of April was around 680,000 centals (141,000 bales of 478 lb.). Marketings in Buganda province are notably backward, sellers being inclined to wait for more remunerative prices. It is difficult to estimate the amount remaining unsold but it is considered that it is not less than 40,000-60,000 centals (9,000-14,000 bales). It would seem, therefore, that the estimate

published in the Crop Report for March for total production — 750,000 centals (150,000 bales) — is approximately correct.

Anglo-Egyptian Sudan : The latest provisional estimate of ginned cotton output is 507,700 centals (106,200 bales) against 665,400 (139,200) in 1929-30 and the five-year mean of 508,000 (106,300), the percentages with reference to these latter being 76.3 and 100.0 respectively.

Union of South Africa : Production of seed cotton in the Union and in Swaziland is estimated this year at 38,850 centals (8,100 bales), a decrease of 40 % on the production of 1929-30 and of 29 % on the average for the five years ending 1928-29.

The chief cause of the poor crop this season is drought, but boll-worm attacks have also considerably reduced expectations in certain areas.

FLAX

Belgium : The crop is good. First sowings are being cultivated. There has been a marked reduction in the crop, of which the condition on 1 June 1931 was considered " average " against " excellent " at the same date last year.

Irish Free State : The area is not more than one-third of that last year.

France : The area devoted to the crop seems to have been very considerably reduced, especially in Brittany.

Area and Crop Condition of Flax.

COUNTRIES	AREA SOWN					CROP CONDITION (†)								
	1931	1930	Average 1925 to 1929	% 1931										
				1930	Aver. = 100									
						1,000 acres								
						I-VI-1931			I-V-1931			I-VI-1930		
						a)	b)	c)	a)	b)	c)	a)	b)	c)
Austria . . . . .	...	8 (1)	11	...	...	2.4	—	—	—	—	—	2.9	—	—
Finland (2)	10	14	13	72.7	74.6	—	—	—	—	—	—	—	—	—
Netherlands	15	37	37	40.0	40.1	(3) 69	—	—	—	—	—	(3) 69	—	—
Rumania . . . . .	...	44	50	...	...	e)	—	—	—	—	—	—	—	—
Czechoslovakia	27	31	52	87.9	53.3	—	—	—	—	—	—	—	—	—
Yugoslavia (4)	17	17	—	97.8	—	—	—	—	—	—	—	—	—	—
Canada	661	582	563	113.6	117.3	—	—	—	—	—	—	—	—	—
India	3,020	2,802	3,392	107.8	89.0	—	—	—	—	—	—	—	—	—
Tunisia	5	—	6	—	84.9	—	100	—	—	100	—	—	—	—

For the explanation of a), b), c), †), see note page 307. — (1) Average 1927 to 1929. — (2) Flax and hemp. — (3) Middle of month. — (4) Winter crops.

Great Britain and Northern Ireland : In Northern Ireland the brairds are generally good but the area sown is considerably less than last year.

Hungary : Brairding has been regular.

Italy : Harvesting is general.

U. S. S. R. : Sowings on 1 June were 2,612,000 acres, that is, 42 % of the area fixed under the Plan. The lateness of the spring and the very slow progress of sowings, especially on individualistic holdings, owing to the low prices, were mainly responsible. To accelerate sowings the Government has decided to increase by 30 % present prices on the internal market and further to introduce compulsory insurance against drought in the current season. On 5 June sowings were 3,986,000 acres, that is 64.5 % of the Plan.

United States : Growth of flax was checked by cool weather in the week ending May 27 in the Northern States, making much re-sowing necessary.

Palestine : Northern Circle : Sowing is in progress on comparatively small areas.
Southern Circle : Sowing is completed over a greatly reduced area; no germination yet noted.

Tobacco.

Belgium : Planting has begun under favourable conditions. The crop is somewhat smaller in the Wervicq district owing to the poor market. On the whole crop condition on 1 June was reckoned to be "average" against "excellent" on the same date last year.

Bulgaria : In the last three weeks of May abundant rains fell. The crop condition of tobacco on June 1 (by the Institute's system) was 95 against 100 last year. The area planted with tobacco this year is 74,000 acres against 78,000 last year and 83,000, the average of 1925-1929; percentages: 95.2 and 89.8.

Hungary : Transplanting is in progress. The young plants are vigorous and have a good appearance.

Italy : Transplanting was finished in May.

U. S. S. R. : The area sown to superior quality on 5 June was 42,000 acres, 18.9% of that planned and that to inferior quality 60,000 acres, 35.0% of the area planned.

Canada : The latest estimate of production of tobacco is 36,717,000 lbs compared with 29,886,000 in 1929 and the average of 32,538,800 for 1924-1928; percentages 122.9 and 112.8.

United States : On May 27 setting of tobacco was advancing in central sections and had begun in Wisconsin.

Indo-China : In Cochin-China the crop varies from average to good and in Annam promises well, but in Cambodia it has suffered from the drought.

Palestine : Transplanting is almost completed. Areas under the crop are 50% less than last year, on account of large stocks still held and poor prices obtained.

Algeria : The crop shows a considerable decrease to 40,000 acres this year from 44,000 acres in 1930 and the five-year mean of 64,000 acres. Percentage 88.6 and 60.6. The aspect of tobacco plantations is fairly good, but at the end of May rain was wanted. Crop condition on 1 June was still good, 100, as on 1 June 1930.

Union of South Africa : Of the total European-grown crop of 12,000,000 lb. it is expected that 1,300,000 lb. will be Turkish tobacco, an amount slightly less than was produced last season.

Production of this type is limited to the Cape south-western districts.

Hops.

Belgium : There has been a certain reduction in area in the Poperinghe district; Japanese mildew has appeared and crop condition on 1 June was considered as "average" against "excellent" at the same date last year.

Great Britain and Northern Ireland : Estimated acreage shows a further decrease as compared with 1930. At the beginning of June vines were generally strong and healthy, though growth was retarded by cold and wet weather. Downy mildew was prevalent in some areas.

Hungary : Development is good.

Canada : The area and production of hops in 1930 are estimated as follows. Area: 950 acres against 1,160 in 1929 and 740, the five year average of 1924-1928; percentages: 81.5 and 128.4; Production: 1,166,000 lbs against 1,445,000 lbs. in 1929 and the average of 1,204,000 lbs.; percentages: 80.7 and 96.8.

Hemp.

Bulgaria : Abundant rains in the last three weeks of May were very favourable to hemp, the crop condition of which on June 1 (according to the Institute's system) was 150 compared with 100 last year. The area sown to hemp this year is estimated at 11,600 acres or 29.2 % larger than that of last year and 19.0 % above the average of 1925-1929.

Hungary : Brairding has been regular.

Italy : Development was very promising in May.

Rumania : Crop condition at the beginning of June was good.

Czechoslovakia : The area sown to hemp this year is estimated at 14,900 acres or 3.6 % smaller than that of last year and 43.4 % below the average of 1925-1929.

U. S. S. R. : The area on 1 June was 941,000 acres, 39 % of that planned. The backwardness of the sowings is explained partly by the unfavourable weather conditions in April and the first half of May and by the abstentions of individualistic holdings owing to low prices. The Government, in the desire to intensify sowings, has decided to raise prices for fibre by 30 % and to introduce compulsory insurance against drought in the current season. On 5 June the area was 3,986,000 acres or 64.5 % of the Plan.

Sericulture.

Bulgaria : The area of mulberry trees this year (12,400 acres) is the same as that of last year and 60.2 % above the average of 1925-1929.

This year's rearing is promising. The first cocoons were expected toward the middle of June.

Italy : Leaves are more abundant than required for rearing. At the end of May the silkworms were about age IV and their development was regular. In the South the first cocoons had appeared. Disease is slight. It is considered that the diminution in the quantity of eggs reared is less than was expected.

The high temperatures of the second decade of June did not injure the last rearing of silkworms or the formation of cocoons, which has been regular. The cocoon crop in the various provinces appears to be exceptionally good.

Indo-China : In Tonkin and in Annam vegetation was good but in Cochin-China the trees were beginning to suffer from drought.

FODDER CROPS

Germany : Clover, meadows and pasture are everywhere vigorous thanks to favourable weather in May. It is expected that in general the first cutting will give satisfactory yields. Resowings, expressed as percentages for the Reich, are 4.3 for clover (1.2 last year) and 8.1 (1.5) for lucerne.

Austria : Mangolds have been frequently attacked by turnip flea. Transplanting could only be partly accomplished owing to the drought. The growth of clover crops is unsatisfactory, red clover being particularly thin and short; alfalfa has a rather better appearance. Lupins have flowered abundantly. Harvesting of winter crops of mixed fodder and vetches has been mostly completed. Due to the shortage of green feed, especially in the valleys, rye is being fed to livestock. Spring fodder crops have grown little; maize for green feed has only been partly planted.

Permanent meadows are in a state of premature growth; the grass is short and thin and flowering has taken place early. The first cutting of meadows yielding three crops has begun. Pastures in general do not provide sufficient feed for livestock.

On June 1 the condition of mixed fodder and vetches was 2.8, against 2.9 on May 1,

Condition of Fodder Crops.

Crops and Countries	Crop Condition (†)								
	June 1, 1931			May 1, 1931			June 1, 1930		
	a)	b)	c)	a)	b)	c)	a)	b)	c)
CLOVER :									
Germany	2.8	—	—	—	—	3.1	2.4	—	—
Austria (1)	2.9	—	—	2.6	—	—	2.2	—	—
Estonia	105	—	—	—	—	—	112	—	—
Italy	—	e)	—	—	—	—	d) c)	—	—
Latvia	—	100	—	—	—	—	150	—	—
Lithuania	137	—	—	—	—	—	137	—	—
Canada (2)	—	—	98	—	—	—	—	—	98
United States	—	—	77.3	—	—	—	—	—	75.2
Egypt	—	100	—	—	100	—	—	—	99
ALFALFA :									
Germany	2.8	—	—	—	—	3.1	2.3	—	—
Austria	2.8	—	—	—	3.0	—	2.3	—	—
Italy	—	e)	—	—	—	—	d) c)	—	—
Canada	—	100	—	—	—	—	—	—	90
United States	—	—	79.4	—	—	—	—	—	81.4
MANGOLDS :									
Germany	2.7	—	—	—	—	—	2.8	—	—
Austria	2.9	—	—	—	—	—	2.7	—	—
Bulgaria	160	—	—	—	—	—	200	—	—
Italy	—	e)	—	—	—	—	d) c)	—	—
TEMPORARY MEADOWS :									
Austria (3)	2.5	—	—	2.5	—	—	2.1	—	—
Bulgaria	110	—	—	—	—	—	115	—	—
Scotland	—	100	—	—	—	—	—	100	—
Italy	—	e)	—	—	—	—	d) c)	—	—
Sweden	3.5	—	—	—	—	—	3.7	—	—
Switzerland	4.4	—	—	3.6	—	—	4.5	—	—
United States (4)	—	—	76.2	—	—	—	—	—	78.7
PERMANENT MEADOWS :									
Germany { irrigated meadows	2.3	—	—	2.9	—	—	2.2	—	—
{ other meadows	2.5	—	—	—	—	3.1	2.5	—	—
Austria	2.8	—	—	2.8	—	—	2.3	—	—
Italy	—	e)	—	—	—	—	d) c)	—	—
Latvia	—	100	—	—	—	—	120	—	—
Switzerland	4.4	—	—	3.5	—	—	4.4	—	—
PASTURES :									
Austria	2.9	—	—	—	3.0	—	2.6	—	—
Scotland	—	100	—	—	—	—	—	100	—
Italy	—	e)	—	—	—	—	d) c)	—	—
Switzerland	4.2	—	—	—	—	—	3.7	—	—
Canada	—	—	97	—	—	—	—	—	90
United States	—	—	78.5	—	—	—	—	—	80.4

a) above the average. — b) average. — c) below the average. — d) above good. — e) good. — f) average. — g) bad. — h) very bad. — (†) See explanation of the various systems on page 307 — (1) Red clover. — (2) Clover and hay. — (3) Klee-grass. — (4) Tame hay.

1931, compared with 2.3 on June 1, 1930; that of maize for green feed was 2.8 against 2.5 on June 1, 1930.

Belgium : In the latter half of May crops were well developed. Clover promised good yields but prospects are less favourable for pasture.

Bulgaria : Abundant rains in the last three weeks of May have been very favourable to the growth of fodder crops. The area of permanent meadows this year is 754,000 acres, compared with 751,000 last year. The area sown to vetches is 343,000 acres compared with 316,000.

Estonia : Crop condition of clover is estimated by correspondants to be 5 % above the average of the last ten years : weather is favourable and a good fodder crop is expected.

Irish Free State : Weather during the first three weeks of May was unfavourable to the growth of grass and root crops, but these responded rapidly to the subsequent higher temperatures and presented a vigorous appearance at the end of the month. Sowing of mangolds was completed during the month and a good portion of the turnip crop was also sown.

France : Production of fodder crops promises to be on the whole abundant ; the first cutting of temporary meadows has begun. Harvesting was hindered in the West and Southwest by bad weather and storms at the end of May ; for this reason, the quality of the fodder cut is not very good. In general, it is considered that the month of May was too rainy for the quality of the crop to be good.

The frequently cold and wet weather was also, in most regions, not very favourable to permanent meadows and pastures, especially as regards quality.

Fodder grain sowings suffered from bad weather in the first half of May.

Great Britain and Northern Ireland : In England and Wales sowing of mangolds was nearing completion at the end of May. Germination of the earlier sown crops was slow but otherwise satisfactory, although there were reports some areas of grub damage and prevalence of weeds. In Northern Ireland, too, the sowing of mangolds was mostly completed, though the brairds had appeared only in a few instances. Drilling to turnips and swedes was in progress throughout the area ; in Northern Ireland there were still large areas to be sown ; early-sown turnips were looking well.

In the latter half of May there was throughout the area a general improvement in pastures which had been retarded by the cold weather and, in Scotland, by the lack of rain, in the earlier part of the month. In England and Wales meadow grass was very slow in starting but the growth made during May indicates that the crop, though late, will be satisfactory ; temporary meadows showed great improvement during the latter half of the month and it is anticipated that the crop will be well above average, though from a few areas less favourable reports were received. In Northern Ireland hay made good progress in May and heavy crops are expected.

Hungary : Mangolds have suffered considerable damage by animals parasites. In some districts re-sowing has been necessary.

Clover and alfalfa, which were greatly damaged by rats during the winter and spring frosts, have recovered a little. The first cutting of these two crops is proceeding sporadically. Mixed vetches and oats and also maize for green fodder have sprouted well and are developing under good conditions.

The growth of meadows is generally slow and grass is thin and short.

Pastures improved a little toward the end of May but those situated in more elevated regions do not furnish sufficient feed for livestock ; those situated in the plains, however, are fairly satisfactory.

Italy : The crop has everywhere been abundant. Hay was damaged in some provinces by rains.

In the following table are given the data of area and production of clover and grass seeds in 1930 compared with the corresponding figures for 1929 and the five year averages.

Crops	1930	1929	Average 1924-1928	% 1930	
				1929 = 100	Average = 100
Area (in acres)					
Red clover	12,400	28,000	23,000	44.3	53.9
Alsike	25,000	48,000	38,500	52.0	65.0
Alfalfa	31,500	12,700	17,100	248.3	184.1
Timothy . . . . .	...	14,100	18,200	—	—
Sweet clover	18,500	6,500	21,400	284.2	86.4
Bluegrass . . . . .	...	8,000	9,400	—	—
Bentgrass	500	1,600	—	32.0	—
Production of seed					
Red clover (centsals)	17,300	49,200	12,200	35.1	100.4
(sh. tons)	2,500	2,500	860		
Alsike (centsals)	37,500	90,000	99,800	41.5	37.6
(sh. tons)	1,000	4,500	5,000		
Alfalfa (centsals)	44,800	6,500	46,000	684.0	97.3
(sh. tons)	2,200	380	2,300		
Timothy (centsals)	20,000	26,700	86,000	74.0	54.6
(sh. tons)	1,000	1,300	1,800		
Sweet clover (centsals)	50,000	15,500	66,700	322.7	75.0
(sh. tons)	2,500	770	3,300		
Bluegrass (centsals)	15,000	3,000	3,800	490.9	417.9
(sh. tons)	750	150	180		
Bentgrass (centsals)	400	434	—	91.9	—
(sh. tons)	20	22	—		

The outstanding features of this table are the recent large increases in production of alfalfa bluegrass and sweet clover seeds and the reductions in red clover and alsike seeds. Compared with the average production the 1930 crop of alsike is much smaller while those of timothy and sweet clover are also considerably reduced.

Palestine. Northern Circle : In Jewish and German colonies hay yields are very good. Harvesting of *hibbeh* (fenugreek) is in progress with excellent yields. — *Southern Circle* : Except where under irrigation, no third cut has yet been obtained from bersim. Heavy yields have been obtained from vetch and oats (hay crops).

United States : Hay stocks on farms on May 1 in the United States amounted to 195,920,000 centals (9,796,000 short tons) compared with 247,520,000 (12,376,000) on May 1, 1930 and 267,420,000 (13,371,000), the average for 1925-1929; percentages : 79.2 and 73.3.

On May 27 meadows and pastures were in good condition east of the Rocky Mountains, except in the northern Great Plains. In the the northern mountain areas ranges were deteriorating in many places, but elsewhere in the west were good to excellent.

Algeria : Mowing has been effected under good conditions despite some storms toward the end of May. Yields from temporary meadows are satisfactory but the permanent meadows are thin, the hay is of poor quality.

Egypt : The weather has favoured the growth and ripening of bersim (Alexandria clover). No disease is reported. The fourth cutting has been finished. Water was generally sufficient except at the extremities of some canals in the provinces of Beheira, El Giza and Fayûm.

French Morocco : Mowing has been accomplished under excellent conditions and the production of hay from temporary meadows has been abundant thanks to the good distribution of rainfall during May and favourable temperatures. Pastures show good stands.

LIVESTOCK AND DERIVATIVES

Production of butter and cheese in the principal importing countries.

Just as some decades ago it was impossible to obtain direct estimates and the volume of plant production was estimated on the basis of consumption per head, in the same way to-day animal production is still in large part estimated on these relatively uncertain data. For a more exact knowledge of the fluctuations of consumption, a matter of great importance, it is necessary first of all to know the amount of production. The volume and development of consumption of dairy products, even in the most important markets cannot generally be known save in a relatively unsatisfactory manner, unless there are adequate statistics of production and, even more, of stocks, which are still more lacking.

The following table shows the results of enumerations of milch cows in recent years, on the one hand in the countries of Western and Central Europe and on the other in North America, which occupy the first place in the import of butter and cheese. The great development of the dairy industry in these countries has in various degrees led them to contribute in large measure to the supplying of their populations with milk products; at times they not only import these products but export even considerable quantities.

Great Britain and Northern Ireland, Germany, Belgium and France are important countries of import of butter and cheese. From this point of view Switzerland and Canada are mentioned only because of their heavy import of butter and the United States owing to their heavy import of cheese. France is important not only for its imports but equally for its exports of butter and cheese, Switzerland and Canada, as is well-known, for the export of cheese. Finally, the United States have by far the heaviest production

of evaporated and condensed milk and a very considerable export surplus of products of that type, which today plays an important part in world commerce.

The above data afford indirectly some idea of the importance of the dairy industry in the countries concerned and also show that the numbers of milk cows have increased only slowly in the last eight years. The increase is relatively most feeble in Great Britain and in the two above-mentioned countries of North America and is most marked in Germany.

Number of Milch Cows
(Thousands).

COUNTRY	1930	1929	1928	1927	1926	1925	1924	1923
Great Britain and Northern Ireland	2,949	2,966	3,028	3,057	2,907	2,969	2,951	2,911
Germany	9,410	9,397	9,473	9,393	9,228	9,146	8,921	8,334
Belgium	926	912	908	902	892	856	839	821
France (1). . . . .	...	8,196	8,118	7,701	7,701	7,590	7,431	7,304
Switzerland (2) . . . . .	...	870	880	870	873	842	810	780
United States	22,975	22,443	21,349	21,228	21,811	22,188	22,498	22,255
Canada	3,683	3,685	3,792	3,894	3,839	3,830	3,727	3,659

(1) Total cows; the number of milch cows in 1925 was 7,031,000. — (2) Estimates; only in 1926 was an enumeration made.

The data below give some indications for the calculation of total milk production in the various countries concerned.

Average yield of milk per milch cow.

Great Britain and Northern Ireland 1924-25	Germany	Belgium	France	Switzerland	United States	Canada
Imperial gallons						
517	488	594	398	640	537	372
American gallons						
621	586	713	478	769	645	446

Data concerning yields of milk per milch cow collected by different and often not quite trustworthy methods afford only limited possibilities for comparison, especially as they generally refer only to isolated years, varying with the country. As a general rule, however, it may be admitted that there has been in recent years an increase in yields per cow.

Appreciation of the volume and development of total milk production is beginning to be a little clearer only in certain countries. In any case it may be said that on the whole the countries importing butter and cheese, with a total of about 50 million milch cows, produce 22 milliards Imp. gallons (26 milliards Amer. gallons) of milk, that is, about half the total world production, which may be estimated — obviously within very approximate limits — at 44 milliards Imp. gallons (53 milliards Amer. gallons). Nearly a quarter of the world milk production is supplied by the United States of America alone.

THE PRODUCTION OF BUTTER.

According to the results of the census of 1924-25 the annual production of butter in Great Britain and Northern Ireland was about 95,460 thousand pounds of which 83,335 was made on farms and 12,125 in the creameries. Nearly $\frac{3}{4}$ of the total produc-

tion or 68,344 thousand pounds are furnished by England and Wales, 7,055 by Scotland and 20,062 by Northern Ireland. Of the butter production, in England and Wales 93 % was made on the farms, in Scotland 84 % and in Northern Ireland 69 %. This proportion appears to be relatively high; it must not be forgotten, however, that farm butter reaching the consumer has largely been subjected to further processing in the industrial establishments. No precise statements may be made concerning butter production in recent years in Great Britain. It may, however, be admitted that the quantity produced yearly has not undergone much modification.

The quantity of butter produced in Germany cannot be estimated exactly. The "Institut für landwirtschaftliche Marktforschung" estimates that a considerable increase has taken place in recent years and that a figure of 771,620 thousand pounds was reached in 1929. The increase in the number of dairy cows certainly corroborates the large increase in dairy production. This increase has resulted in a considerable augmentation of butter production, despite the expansion of consumption of fresh milk. More exact data are possessed for Bavaria, which it is calculated, in 1929, produced about 110,231 thousand pounds of butter, of which 57.5 % was farm butter and 42.5 % creamery butter.

Statistical estimates place the butter production of Belgium in 1928 at 119,050 thousand pounds of which 83,776 were farm butter and 35,274 creamery butter. In Belgium also an increase in butter production seems probable.

The Swiss production of butter is given in the following table for a series of years.

Production of butter in Switzerland.

YEAR	000 lbs	Index-numbers (1929 = 100)	YEAR	000 lbs	Index-numbers (1929 = 100)
1920	34,613	100	1925	27,558	79.6
1928	32,629	94.3	1924	26,676	77.1
1927	28,660	82.8	1923	28,660	82.8
1926	29,763	86.0	1922	28,660	82.8

From 1927 to 1929 production showed an ascent, to which the measures taken by the Central Union of Swiss Milk Producers and subsidies from the Confederation have contributed.

The total production of butter in 1929 was composed as follows : 1) Table butter, the production of which is subsidised by the Central Union : 12,209 thousand pounds ; 2) Other cream butter : 8,074 thousand pounds ; 3) Cheese factory butter : 14,330 thousand pounds.

France and Canada, which in previous years have been important butter exporting countries — France, indeed, having exported even in 1930 a quantity nearly equalling that imported — have already been dealt with in the articles on butter production in the principal exporting countries (see Bulletins No. 12, 1930 and No. 2, 1931). No exact data of butter production for consecutive years are possessed for France ; production in this country in 1926 was 367,291 thousands pounds. The quantity of milk converted into butter has from year to year shown fluctuations, which, however, have not been very wide.

Butter production in Canada, according to the final official statistics for 1929, was 258,810 thousand pounds. According to the preliminary reports, the production of creamery butter, which, in 1929 represented about $\frac{2}{3}$ of the total production, increased in 1930. Production has apparently continued its upward trend during the first few months of the present year.

The following table gives some indication of the importance of home production in supplying home requirements in the principal importing countries.

Production of butter expressed as a percentage of apparent consumption.

Great Britain and Northern Ireland (1927-29)	13 %
Germany (1927-29).	72
Belgium (1929-30)	90
Switzerland (1927-29)	64
France (1930)	100
Canada (1929-30)	88

The United Kingdom is seen to be most in need of imported supplies. France, on the contrary, in 1930 could have almost completely covered home requirements. In the first quarter of 1931 net imports of butter increased, while until 1929 there was an excess of exports. Canada has considerably reduced its butter imports during the first quarter of 1931. There is reason to believe that Canada will again be in a position to satisfy a large proportion of home needs with home-produced butter.

THE PRODUCTION OF CHEESE.

There are considerable difficulties in establishing the quantities of cheese produced in the various countries, all the more so since there are uncertainties as to specification in the statistics, when these exist. For Great Britain and Northern Ireland there are no precise statistical data. The most recent official estimate of cheese production relates to the 1924-25 season and indicates for Great Britain 96,544,000 lb., for England and Wales 74,592,000 lb. and for Scotland 21,952,000 lb. The production of Northern Ireland is very small. In England and Wales 75.4 % of the output originates on farms and 24.6 % in creameries and factories, in Scotland 74.5 % and 25.5 % respectively. It may, then, be said that in Great Britain three-quarters of the cheese production is of farm origin. Of the cheese produced by creameries and factories in Great Britain in 1924 about 90 % was hard and the rest soft. Of the hard-pressed types the most important are Cheddar, Cheshire, Lancashire and Dunlop; of the lightly pressed Caerphilly, Stilton and Wensleydale must be mentioned; of the soft types Cambridge and York. Cheese production has undoubtedly progressed in the post-war period. The relative figures are, however, not very reliable and for recent years official data are completely lacking.

As regards cheese production in Germany there are available only approximate estimates, presenting amongst themselves considerable divergences. A quite recent estimate of the Institut für landwirtschaftliche Marktforschung seems very careful and indicates an annual production of 297.7 million lb. cream cheeses and 143,300,000 lb. skim cheeses. Total output, therefore, is 441 million lb. if cottage cheese, which is not, however, of negligible importance, is excluded. The producing regions of Southern Germany are particularly important. Bavaria produced in 1929 26,676,000 lb. of hard cheeses and 107,586,000 lb. of soft. The centre of production in Southern Germany is the Allgäu, where hard cheese, known under the name of Emmenthal, is produced. In the producing centre of southern Germany devoted to the manufacture of soft cheese Limburger is the predominant type. Considerable quantities of Tilsiter cheese come from East Prussia, particularly from the two great plains of the Vistula and the Memel,

and finally from the producing centre of Central Germany (Harzer). Manufacture, which is generally carried on in small factories, shows an undoubted increase.

Little is known of the production of Belgium. According to 1928 statistics it is 11,023,000 lb. The types produced are in large part analogous to those of the neighbouring cheese centres in the Netherlands.

France, which has generally a large export, only very little below its import, has already been dealt with in the Monthly Crop Report for December 1930 in connection with the cheese production of the principal European exporting countries. The total production of cheese in France, which, according to 1926 data was 385,369,000 lb., would seem to have grown still further, as each year more milk is used for cheese manufacture. On the occasion of the 1926 estimate there was taken into account, besides cheese made from cows' milk, 20 to 22 million lb. of cheese made from ewes' milk (Roquefort) and 22 million lb. made from goats' milk.

In the United States the annual statistics of dairy products were considerably enlarged in scope in 1929, so that in that country the volume of cheese production can now be fixed in a satisfactory fashion, according to the final results of the official statistics of 1929, excluding "cottage, pot and bakers'" and relatively very small amounts produced on farms, at 483,933,000 lb. Of this amount no less than 370,314,000 lb. is "American whole milk cheese", 34,405,000 lb. cream and Neufchatel, 31,763,000 lb. brick and Munster, and 19,406,000 lb. Swiss types. These types are the most important; in addition 8,568,000 lb. of Limburger and 5,948,000 lb. of Italian types were produced, the remainder being on other types. Of this total quantity almost two-thirds (63 %) were manufactured in Wisconsin. The neighbouring states of Minnesota, Michigan, Illinois and Indiana, as well as California, Oregon, and Idaho in the far west, and, before all these, the state of New York, have also a certain importance. As regards the development of cheese production in the United States in the years previous to 1929 the statistics do not give a very clear idea; it is certain, however, that during the last decade annual production has greatly increased. According to preliminary figures, production in 1930 exceeded that of 1929 by only 0.1 %. For the first quarter of 1931 there was a decrease in output as compared with the corresponding period of 1930.

Amongst the above-mentioned importing countries the United States have the greatest production. If the enormous quantity of condensed and evaporated milk (2,226,648,000 lb. in 1929) as well as the quantity of butter (2,177,027,000 lb. in 1929) produced, are taken into account some idea may be obtained of the place occupied by the United States in the milk transforming industry.

The relation between production and consumption in the principal importing countries, as indicated by the following percentages for recent years, has only an approximate value; for the United States only has a more exact calculation been possible.

Production in relation to apparent consumption of cheese.

Great Britain and Northern Ireland (1927-29)	24
Germany (1927-29)	75
Belgium (1929-30)	20
France (1930)	94
United States (1929-30)	88

Belgium and Great Britain and Northern Ireland, it will be seen, have especial need of imported supplies; the latter is more self-sufficient in cheese than in butter. For

France the percentage has been calculated for 1930 only, since, in comparison with the preceding year, it has changed as a consequence of the marked increase in imports of cheese.

E. P.

Condition of livestock and derivatives.

Belgium : Livestock is being pastured, thus diminishing feeding costs. The animals are in good condition, but from the economic point of view, the situation has deteriorated due to the low sale prices of dairy products, cattle for slaughter and pigs. Horse rearing has recovered a little.

Great Britain and Northern Ireland : In England and Wales pastures in May were usually stocked up to their capacity. In Scotland stocks are generally on grass and ample supplies of concentrated feeding-stuffs are available. In Northern Ireland, too, purchased feeding-stuffs are plentiful and there are ample supplies of home-grown feeding-stuffs except oats, which are short in some districts. Milk yields are showing seasonal increase in England and Wales and in Northern Ireland and have generally been well maintained in Scotland, save in one district in the south, where serious losses have occurred from convulsions associated with lactation. In Northern Ireland the general condition of dairy stock is good and there are few reports of ill-health.

Netherlands : In the majority of provinces milk production in May equalled the average for the month ; in some it was lower and in others really good.

Switzerland : According to the preliminary results of the enquiry made by the Swiss Union of Peasants, covering at present 658 societies, the quantity of milk delivered in April 1931 is 16.2 % below that recorded in April 1930. The decrease is 16.4 % for German Switzerland and 15.4 % for Romansch Switzerland. If deliveries in 1913 are valued at 100 the figure for last April would be 97. The figure for April 1931 consequently shows a reduction of 3 % compared with that of April 1913.

Canada : Production of honey in 1930 is estimated at 31,170,000 lbs. against 28,262,000 in 1929 and the average of 20,847,000 for the three years 1926-1928 ; percentages 110.3 and 149.5.

United States : On May 27 ranges in northern mountain areas were deteriorating in many places and livestock were shrinking with locally heavy losses of lambs. Except in the Pacific Northwest, livestock were in good to excellent condition in the West with improvement noted in some areas where shrinkages had occurred.

Milk production per cow in the herds operated by 20,000 crop correspondents averaged 15.84 lb. per cow on about May 1 compared with 15.92 on the same date last year. Except for a slight decrease in the proportion of the cows being milked in the Northwest, production per cow in the herds is rather uniformly close to the production at this time last year. As the number of milk cows on the farms has been increased, the total milk production is probably about 2 % above production at this time last year.

Italian Aegean Islands : The census data obtained through the payment of taxes on pasturages and farms for 1930 are as follows : Goats 63,739 ; sheep 63,523 ; pigs 2,968 ; horses 9,683 ; cattle 6,853.

French West Africa : During the first quarter of 1931, the livestock situation in general was fairly satisfactory, despite the continued drought and damage by locusts on the pastures of the Sudan. Cattle disease is diminishing but in French Guinea centres of carbuncle infection were fairly numerous and in the French Sudan, a recurrence of peripneumonia was reported in some districts.

Algeria : The condition of livestock is excellent from the point of view of both health and maintenance. Pig raising is extending. Shearing of sheep has begun.

French Morocco : Stock are in excellent condition, thanks to the abundance of pasture and fodder and to good watering.

Union of South Africa : With the exception of certain areas of the West Coast of Cape Province where the drought of last summer had not been broken, winter prospects were considered at the end of April to be most favourable. Veld was generally improved by the late rains, though in certain districts of the Orange Free State it was not as good as it should have been, owing to the drought during February and March. The later rains should, however, in these districts, as generally, have ensured a plentiful supply of green feed during the winter and unusually heavy supplies of hay and silage are also expected to be available. Generally speaking, stock were in good condition, though outbreaks of East Coast fever were reported in certain districts of Cape Province, Natal and Transvaal, while in Natal a number of deaths from horse-sickness have occurred and in Transvaal precautions have had to be taken in the north-east to prevent the spread of foot-and-mouth disease from across the Limpopo River. Winter lambing is expected to be a success.

The dairy industry in the Netherlands.

Butter production in 1930 did not increase at the same rate as in preceding years, owing probably to the less unfavourable market conditions for cheese and the various kinds of condensed and dried milk than for butter.

As no exact figures for the production of condensed or dried milk are available, figures for export are published in the following table; these show the trend of production as well, especially as the home consumption of these products is very low. For comparison with the quantities of butter and cheese produced the quantities of these products exported are also given. All the latter figures represent gross weight (in crates and tins). All exported butter and cheese is under State control.

DESCRIPTION	1930	1929	1928	1927	1926	1925
	thousand pounds					
<i>Production :</i>						
Butter under State control	178,354	170,886	171,906	170,638	165,189	146,829
Butter manufactured under special control in the margarine factories	873	899	689	885	1,070	1,146
Butter not controlled (not exportable)	13,109	13,389	15,340	16,105	17,461	17,381
Cheese under State control	293,843	288,790	281,355	262,842	255,011	230,913
Cheese not controlled (not exportable)	8,051	8,404	10,002	14,789	15,002	18,772
<i>Export :</i>						
Butter	92,394	104,325	103,488	105,716	100,430	87,070
Cheese	206,739	211,237	208,002	214,568	185,709	175,713
Sweetened condensed whole milk	78,355	72,920	62,953	63,645	58,418	50,281
" skim milk	275,980	269,818	266,815	243,398	221,526	187,151
Unsweetened evaporated whole milk	38,742	235,098	24,172	17,679	13,036	11,028
Whole milk powder	18,402	22,714	25,280	23,664	19,182	19,180
Skim milk powder	18,644	11,632	8,281	6,903	7,302	5,269
Sterilised milk, cream, etc.	6,960	10,812	10,750	9,376	7,784	13,175

The export data show a sharp decrease in the export of butter while that of cheese, though a little smaller than last year has remained within the limits of the fluctuations of recent years. On the other hand, it is very interesting to note, the internal consumption of butter increased considerably in 1930, due to the fall in prices, which has diminished the margin between those of butter and those of margarine. The second table, in which are compared the consumption of butter and of margarine in recent years and the average retail prices in Amsterdam, illustrates this. Consumption has been calculated taking account of the small import as well as of packing, which is estimated in external trade at 9 % of the gross weight.

	1930	1929	1928	1927	1926	1925
<i>Total consumption (1000 lbs.):</i>						
Butter	112,216	100,311	98,547	95,240	94,709	91,051
Margarine	154,545	158,292	142,640	136,026	121,696	120,378
<i>Consumption per head (lb.):</i>						
Butter	14.3	13.0	12.8	12.6	12.8	12.3
Margarine	19.6	20.3	18.5	17.9	16.3	16.3
<i>Retail prices (Dutch, cents. per lb.):</i>						
Butter	94	112	112	108	106	120
Margarine	54	54	54	54	54	54

Livestock in Latvia.

There are given below the numbers of livestock in Latvia in 1930 compared with those for the preceding ten years:

Year	Horses	Cattle	Sheep	Pigs
1930	359,000	1,026,300	872,900	522,700
1929	356,344	978,399	905,498	382,196
1928	365,200	960,600	1,090,400	535,000
1927	369,300	966,600	1,127,500	534,600
1926	365,000	955,000	1,152,000	521,000
1925	351,900	915,800	1,181,600	497,100
1924	340,200	905,000	1,235,000	458,000
1923	341,200	910,900	1,488,200	487,300
1922	303,000	810,500	1,161,500	402,000
1921	282,500	799,500	1,132,000	482,000
1920	261,000	768,000	978,000	481,000

The rapid increase in the number of horses, which in 1927 had reached its maximum with an increase of 41.5 % compared with 1920, shows a slight recovery after a fluctuation in 1928 and a more accentuated one in 1929.

Cattle breeding has continued its uninterrupted upward trend and the number in 1930 exceeds that of ten years ago by 33.6 %. The number of sheep, which reached its maximum in 1923, has diminished constantly and in 1930 represented only 58.7 % of the latter figure; it is also 10 % below the number in 1920.

With reference to pigs, the large and abrupt decline in 1929 due to a large fall in pork prices has been followed by a vigorous recovery in 1930 the number in that year exceeding the figure for 1920 by 8.7 %.

Livestock in Argentina.

In the following table are given detailed figures of the different kinds of livestock in Argentina at the date of the last census of 1 July 1930, according to sex, age and breed.

CLASSIFICATION	Purebred	Crossbred	Totals
<i>Horses :</i>	(Number of head)		
Mares over 2 years of age	17,362	3,352,538	3,369,900
Fillies over 1 year of age	3,261	615,173	618,433
Fillies under 1 year of age	2,258	386,765	389,023
Colts under 1 year of age	2,767	442,107	444,874
Colts over 1 year of age	793	645,837	646,630
Stallions for sale	1,690	42,724	44,414
Stallions for stock breeding	3,039	132,440	135,479
Saddle horses	—	1,829,606	1,829,606
Heavy draught horses	—	1,130,076	1,130,076
Light draught horses	—	1,202,087	1,202,087
Unclassified	—	—	47,589
Totals	31,170	9,779,352	9,858,111
<i>Cattle :</i>			
Cows over 2 years of age ; in calf	69,900	9,936,498	10,006,398
Dairy cows	12,292	3,726,196	3,738,488
Heifers, from 1 to 2 years of age	19,441	3,812,504	3,831,945
Sucking calves (female) under 1 year of age	20,525	3,621,038	3,641,563
Sucking calves (male) under 1 year of age	16,562	3,391,613	3,408,175
Bullocks from 1 to 2 years of age	—	2,761,595	2,761,595
Heifers over 2 years of age	—	3,154,941	3,154,941
Young bulls, from 1 to 2 years of age	12,886	529,713	542,599
Bulls over 2 years of age	26,333	643,026	669,359
Oxen	—	447,192	447,192
Unclassified	—	—	9,600
Totals	177,939	32,024,316	32,211,835
<i>Sheep :</i>			
Ewes	141,210	28,035,102	28,176,312
Lambs (male) under 1 year of age	25,573	4,173,531	4,199,104
Lambs (female) under 1 year of age	27,855	6,513,449	6,541,304
Sheep, castrated	—	4,451,581	4,451,581
Rams (breeding)	20,942	1,017,988	1,038,930
Unclassified	—	—	5,990
Totals	215,580	44,101,651	44,413,221
<i>Pigs :</i>			
Sows, breeding	7,412	780,107	787,519
Sucking pigs (female)	7,544	838,363	845,907
Sucking pigs (male)	7,667	911,848	919,515
All castrated pigs	61	1,065,856	1,065,917
Boars, breeding	3,444	142,576	146,020
Unclassified	—	—	8,860
Totals	26,128	3,738,750	3,768,738

The predominant cattle strain is the Shorthorn of which, there are 18,109,465 head ; this strain is followed, in order of importance, by the Hereford, Polled Angus, Dutch, Norman and others.

In the case of sheep the largest proportion is of the Lincoln strain, which alone is represented by 14,504,005 head ; followed by the Argentina merino with 13,191,306 head, the Romney Marsh with 7,556,531 head, the Corriedale with 3,397,469 head and others of minor importance.

The most diffused pig strain is the Duroc Jersey, while for horses there are numerous breeds, the most important of which is the Percheron.

TRADE

COUNTRIES	APRIL				'NINE MONTHS (August 1-April 30)				TWELVE MONTHS (August 1-July 31)	
	EXPORTS		IMPORTS		EXPORTS		IMPORTS		EXPORTS	IMPORTS
	1931	1930	1931	1930	1930-31	1929-30	1930-31	1929-30	1929-30	1929-30
Wheat. — Thousand centals (1 cental = 100 lbs).										
<i>Exporting Countries:</i>										
Bulgaria	434	0	0	9	1,559	31	0	930	66	990
Hungary	66	666	0	0	4,674	8,186	0	0	9,943	0
Lithuania	66	4	0	0	581	20	4	2	55	2
Rumania . . . . .	...	...	...	...	(1) 6,270	(1) 137	(1) 4	(1) 40	1,279	40
U. S. S. R. . . . .	...	...	...	...	(2) 60,076	(2) 2,754	...	...	5,732	...
Yugoslavia	71	439	0	0	2,833	12,233	...	...	13,295	...
Canada	2,509	2,067	4	9	98,701	62,067	53	571	93,461	602
United States	2,127	1,882	1,067	483	29,990	42,014	9,182	5,307	57,274	7,585
Argentina	11,202	6,228	...	...	45,043	74,195	...	...	80,389	...
Chile . . . . .	...	...	...	...	(2) 428	(2) 9	(2) 0	(2) 0	481	0
India	4	4	745	137	1,892	249	5,049	8,494	2,768	8,931
Turkey . . . . .	...	...	...	...	(2) 181	(2) 7	(2) 408	...	24	414
Algeria	141	230	60	0	5,815	2,535	540	525	3,206	545
Tunis	55	123	128	18	1,356	2,615	410	93	3,382	99
Australia . . . . .	...	...	...	...	(2) 42,415	(2) 16,563	(2) 0	(2) 0	24,460	0
<i>Importing Countries:</i>										
Germany	0	11	1,008	2,454	265	2,277	12,348	26,996	2,293	31,725
Austria	0	4	470	483	84	35	3,430	4,125	68	6,455
Belgium	165	44	2,948	1,962	897	721	20,918	19,006	805	25,794
Denmark	2	9	379	258	22	126	3,012	2,258	128	2,903
Spain . . . . .	...	...	...	...	(2) 4	(2) 11	(2) 0	(2) 2,145	11	1,542
Estonia	0	0	11	46	0	0	282	425	0	540
Irish Free State . . . . .	...	...	...	...	(2) 18	(2) 0	(2) 4,782	(2) 3,889	0	5,547
France	0	353	4,605	1,182	968	2,714	28,415	17,081	8,007	19,954
Gr. Brit. and N. Ir.	49	104	9,154	6,460	562	1,270	93,490	85,914	1,482	114,048
Greece	0	0	1,318	763	0	0	9,080	9,423	0	12,339
Italy	0	0	4,661	3,360	22	4	36,628	13,805	4	27,150
Latvia . . . . .	...	...	...	...	(2) 0	(2) 816	(2) 1,005	...	0	1,523
Norway . . . . .	...	...	238	240	...	...	2,493	1,739	...	2,216
Netherlands	15	9	1,695	725	9	637	13,433	10,949	231	14,936
Poland	172	11	4	9	1,501	214	44	236	289	331
Portugal . . . . .	...	...	35	1,059	...	...	207	2,205	...	8,732
Sweden	2	37	197	198	31	963	2,414	4,015	1,003	4,982
Switzerland	0	0	688	741	2	0	8,644	7,103	0	9,580
Czechoslovakia	0	0	300	815	4	71	4,985	2,690	108	3,802
Japan . . . . .	...	...	2,008	1,206	...	...	10,406	8,119	...	10,922
Syria and Lebanon . . . . .	...	...	...	...	(2) 106	(2) 2	(2) 33	(2) 130	26	146
Egypt . . . . .	...	...	...	...	(2) 2	(2) 11	(2) 763	(2) 2	13	24
Union of South Africa . . . . .	...	...	...	...	(3) 0	(3) 0	(3) 1,127	(3) 1,316	0	1,680
New Zealand . . . . .	...	...	...	...	(2) 0	(2) 180	(2) 93	(2) 126	130	170
Totals	17,389	12,153	31,711	22,189	307,432	232,349	273,999	236,334	317,795	316,961
Rye. — Thousand centals (1 cental = 100 lbs).										
<i>Exporting Countries:</i>										
Germany	2	419	37	309	1,213	8,550	558	1,777	10,529	1,922
Bulgaria	201	0	0	0	1,162	9	0	0	9	0
Hungary	90	196	0	0	1,493	2,244	0	0	2,919	0
Poland	423	882	0	4	5,487	5,695	0	18	7,293	20
Rumania . . . . .	...	...	...	...	(1) 602	(1) 340	(1) 0	(1) 0	377	0
Czechoslovakia	7	49	2	11	470	1,016	117	154	1,325	254
U. S. S. R. . . . .	...	...	...	...	(2) 11,023	(2) 1,268	...	...	4,991	...
Yugoslavia	0	0	0	0	0	31	4	0	35	...
Canada	0	7	0	0	666	123	0	150	194	160
United States	0	24	...	...	73	1,362	...	...	1,378	...
Argentina	119	2	...	...	445	732	...	...	767	...
Turkey . . . . .	...	...	...	...	(2) 282	(2) 82	(2) 0	(2) 31	168	81
Algeria	0	0	0	0	35	31	0	4	35	4
<i>Importing Countries:</i>										
Austria	0	0	309	225	9	0	1,550	1,779	2	2,857
Belgium	11	0	437	49	77	4	2,337	703	7	983
Denmark	0	0	575	498	0	2	5,483	4,003	2	6,151
Estonia	0	0	31	163	0	0	117	1,323	0	1,563
Finland	0	0	46	172	0	0	1,200	2,639	4	3,814
France	0	0	152	4	0	2	1,045	152	7	181
Italy	0	0	77	53	0	0	476	179	0	824
Latvia . . . . .	...	...	...	...	(2) 0	(2) 4	(2) 198	(2) 1,640	7	2,191
Lithuania	4	11	0	0	150	22	0	24	86	24
Norway	0	0	119	370	0	0	2,438	2,848	0	3,005
Netherlands	163	7	430	251	454	73	4,991	2,055	90	2,906
Sweden	2	0	24	174	2	11	456	1,696	11	2,240
Switzerland	0	0	15	20	0	0	148	187	0	154
Totals	1,631	1,597	2,254	2,312	23,643	21,691	21,694	21,911	26,334	26,874

(1) (2) (3) See notes page 359.

COUNTRIES	APRIL				NINE MONTHS (August 1-April 30)				TWELVE MONTHS (August 1-July 31)	
	EXPORTS		IMPORTS		EXPORTS		IMPORTS		EXPORTS	IMPORTS
	1931	1930	1931	1930	1930-31	1929-30	1930-31	1929-30	1929-30	1929-30
Wheat flour. — Thousand cents (1 cental = 100 lbs).										
<i>Exporting Countries:</i>										
Germany	4	57	11	33	121	1,023	159	656	1,226	710
Belgium	13	20	31	7	139	223	207	542	251	564
Bulgaria	31	0	0	0	123	7	0	0	7	0
Spain	...	...	...	...	(2)	44 (2)	55 (2)	0 (2)	0	66
France	756	434	51	51	4,905	2,231	474	280	3,796	392
Hungary	190	298	0	0	8,338	4,612	0	0	5,064	0
Italy	79	51	22	15	952	1,265	143	53	1,400	93
Latvia	...	...	...	...	(2)	66 (2)	20 (2)	2 (2)	2	42
Poland	46	35	4	4	547	115	20	29	154	35
Rumania	...	...	...	...	(1)	251 (1)	104 (1)	0 (1)	0	317
Yugoslavia	4	13	0	0	84	273	2	0	320	2
Canada	639	884	2	7	10,283	9,698	37	115	13,285	148
United States	1,400	1,834	0	0	18,034	19,520	2	2	25,234	2
Argentina	168	185	—	—	1,412	2,053	—	—	2,604	—
Chile	...	...	...	...	(2)	93 (2)	139 (2)	0 (2)	13	203
India	88	88	0	0	774	853	2	2	1,113	2
Turkey	...	...	...	...	(2)	29 (2)	2 (2)	9 (2)	73	75
Japan	568	229	13	51	2,780	1,766	183	284	2,304	379
Algeria	11	18	7	4	234	93	37	46	134	57
Tunis	13	15	0	0	196	110	9	2	159	4
Australia	...	...	...	...	(2)	6,646 (2)	6,016 (2)	0 (2)	0	9,166
<i>Importing Countries:</i>										
Austria	0	0	249	245	4	2	1,899	2,370	4	3,772
Denmark	2	2	123	108	18	24	1,252	1,065	31	1,440
Estonia	0	0	2	11	0	6	77	93	0	123
Irish Free State	...	...	...	...	(2)	20 (2)	37 (2)	2,441 (2)	2,414	64
Finland	...	...	101	159	—	—	1,653	1,861	—	2,487
Gr. Britain and N. Ir.	344	306	1,096	1,049	3,450	3,523	9,550	9,319	4,727	12,487
Greece	...	...	9	44	—	—	139	421	—	494
Norway	0	0	75	119	2	2	913	1,034	2	1,376
Netherlands	11	13	102	243	95	165	2,712	1,803	203	2,760
Portugal	...	...	22	20	—	—	150	106	—	152
Sweden	0	7	4	29	2	77	62	291	90	379
Czechoslovakia	0	0	7	289	11	7	2,394	2,652	13	3,333
Ceylon	...	...	33	87	—	—	340	333	—	430
Java and Madura	...	...	...	...	—	—	(2)	653 (2)	705	1,142
Indo-China	...	...	...	...	—	—	(2)	315 (2)	351	549
Syria and Lebanon	...	...	...	...	(2)	9 (2)	0 (2)	108 (2)	309	0
Egypt	...	...	...	...	(2)	0 (2)	4 (2)	2,308 (2)	3,757	4,729
Union of South Africa	...	...	...	...	(3)	9 (3)	15 (3)	220 (3)	353	31
New Zealand	...	...	...	...	(2)	2 (2)	139 (2)	120	4	181
Totals	4,447	4,549	2,654	2,523	54,721	54,036	28,661	31,461	72,624	62,945
Barley. — Thousand cents (1 cental = 100 lbs).										
<i>Exporting Countries:</i>										
Bulgaria	146	18	0	0	1,477	287	0	0	309	9
Spain	...	...	...	...	(2)	130 (2)	110 (2)	0 (2)	0	103
Hungary	7	68	2	0	564	2,156	2	0	2,363	0
Lithuania	0	31	0	0	13	108	0	0	143	0
Poland	112	580	0	0	2,780	5,761	0	2	5,794	2
Rumania	...	...	...	...	(1)	23,080 (1)	23,235 (1)	0 (1)	0	31,365
Czechoslovakia	64	60	0	0	2,974	2,405	4	15	2,519	15
U. S. S. R.	...	...	...	...	(2)	22,960 (2)	9,187	—	12,201	—
Yugoslavia	7	7	—	4	18	243	130	159	282	159
Canada	362	9	0	0	1,975	1,206	—	7	1,250	9
United States	346	300	—	—	3,960	7,740	—	—	8,774	—
Argentina	1,008	313	—	—	4,257	2,143	—	—	2,575	—
Chile	...	...	...	...	(2)	370 (2)	406 (2)	0 (2)	0	897
India	...	...	...	...	2	4	0	11	26	11
Syria and Lebanon	...	...	...	...	(2)	408 (2)	342 (2)	4 (2)	20	503
Turkey	...	...	...	...	(2)	289 (2)	42 (2)	0 (2)	7	51
Algeria	97	51	68	0	1,378	2,013	225	126	2,202	130
Egypt	...	...	...	...	(2)	2 (2)	62 (2)	64 (2)	31	64
Tunis	2	117	84	7	168	2,485	396	31	2,652	53
Australia	...	...	...	...	(2)	1,168 (2)	229 (2)	0 (2)	0	324
<i>Importing Countries:</i>										
Germany	0	256	1,554	3,212	62	681	12,875	44,825	1,089	49,785
Austria	0	0	168	121	0	9	1,552	1,245	9	1,653
Belgium	194	40	1,168	694	666	115	8,676	6,504	176	7,857
Denmark	68	20	774	982	1,177	1,188	11,526	2,344	1,232	4,450
Estonia	...	...	...	...	16	—	13	66	—	68
Irish Free State	...	...	...	...	(2)	20 (2)	24 (2)	267 (2)	7	26
France	7	35	928	44	22	227	5,820	1,301	348	1,437
Gr. Britain and N. Ir.	2	9	983	1,243	57	31	15,900	11,782	33	14,454
Greece	...	...	...	...	33	—	75	384	—	401
Italy	0	0	60	46	0	9	644	247	9	368
Latvia	...	...	...	...	(2)	0 (2)	0 (2)	179 (2)	95	123
Norway	0	0	11	95	0	0	787	463	0	752
Netherlands	106	35	1,074	935	518	456	11,662	5,880	487	7,934
Switzerland	...	...	...	...	0	0	2,280	1,548	0	1,918
Sweden	0	0	179	121	0	0	—	—	—	—
Totals	2,528	1,949	7,653	7,545	71,191	62,364	72,739	77,699	77,925	91,904

(1) (a) (s) See notes page 138.

COUNTRIES	APRIL				NINE MONTHS (August 1-April 30)				TWELVE MONTHS (August 1-July 31)	
	EXPORTS		IMPORTS		EXPORTS		IMPORTS		EXPORTS	IMPORTS
	1931	1930	1931	1930	1930-31	1929-30	1930-31	1929-30	1929-30	1929-30
Oats. — Thousand centals (1 cental = 100 lbs).										
<i>Exporting Countries:</i>										
Germany	2	1,016	189	29	216	11,755	550	582	15,245	620
Irish Free State	...	...	...	...	(2)	227 (2)	527 (2)	201 (2)	40	115
Hungary	0	42	33	0	13	644	08	0	728	0
Lithuania	2	51	0	0	82	184	0	0	179	0
Poland	11	201	0	7	121	1,279	0	64	1,803	66
Rumania	...	...	...	...	(1)	1,155 (1)	919 (1)	0 (1)	0	1,834
Czechoslovakia	9	73	2	15	710	1,052	9	101	1,345	128
U. S. S. R.	...	...	...	...	(2)	9,513 (2)	1,008	...	1,658	...
Yugoslavia	0	0	4	4	2	9	84	33	9	51
Canada	53	9	0	185	893	421	234	1,142	679	1,132
United States	4	42	7	2	97	1,358	141	29	1,576	49
Argentina	1,850	983	...	...	10,207	4,504	...	...	6,508	...
Chile	...	...	...	...	(2)	1,175 (2)	287 (2)	0 (2)	0	622
Algeria	121	35	11	0	1,036	340	126	119	459	128
Tunis	49	46	0	0	470	668	0	0	860	0
<i>Importing Countries:</i>										
Austria	0	0	150	170	2	0	1,498	1,944	2	2,707
Belgium	0	0	130	362	2	2	2,712	2,083	4	2,773
Denmark	2	2	254	392	20	18	013	1,944	20	2,800
Estonia	0	0	35	18	0	0	07	75	0	106
Finland	0	0	44	62	7	0	123	348	0	476
France	4	15	181	79	18	80	1,479	1,466	77	1,671
Gr. Brit. and N. Irel.	106	51	529	754	337	254	7,864	6,510	306	9,658
Greece	...	...	0	11	...	...	0	201	...	207
Italy	0	0	434	185	0	0	3,232	1,116	0	1,700
Latvia	...	...	...	...	(2)	4 (2)	0 (2)	31 (2)	84	163
Norway	0	0	2	2	4	2	4	79	2	170
Netherlands	71	22	247	256	342	159	2,668	2,943	185	3,728
Sweden	7	2	209	84	40	55	855	1,054	60	1,200
Switzerland	0	0	403	417	0	0	3,832	3,402	0	4,308
Australia	...	...	...	...	(2)	55 (2)	22 (2)	0 (2)	2	49
Totals	2,391	2,680	2,874	3,043	26,748	25,477	26,567	25,461	35,934	34,126
Maize. — Thousand centals (1 cental = 100 lbs).										
SIX MONTHS (November 1-April 30)										
<i>Exporting Countries:</i>										
Bulgaria	616	514	0	0	2,427	1,638	0	0	4,017	0
Hungary	18	190	302	0	212	2,870	730	4	3,351	132
Rumania	...	...	...	...	(1)	4,059 (1)	8,451 (1)	0 (1)	28,424	2
Yugoslavia	950	1,552	0	0	4,958	7,436	7	9	12,013	33
United States	84	534	18	20	719	2,846	406	150	4,003	708
Argentina	15,357	6,433	...	...	67,810	40,340	...	...	96,331	...
Brazil	...	...	...	...	(2)	11 (2)	311	...	328	...
Java and Madura	...	...	...	...	(2)	869 (2)	520	...	1,759	...
Indo-China	...	...	...	...	(2)	1,526 (2)	1,213	...	2,339	...
Syria and Lebanon	...	...	...	...	(2)	110 (2)	192 (2)	24 (2)	434	35
Egypt	...	...	...	...	(2)	4 (2)	11 (2)	29 (2)	20	33
Union of South Africa	...	...	...	...	(3)	981 (3)	1,228 (3)	0 (3)	12,267	0
<i>Importing Countries:</i>										
Germany	0	0	911	1,755	0	0	3,738	9,932	0	16,506
Austria	0	2	509	421	0	7	2,513	2,377	18	4,312
Belgium	104	15	974	717	364	121	7,004	5,756	220	12,908
Denmark	0	0	525	642	0	0	4,034	3,197	0	6,250
Spain	...	...	...	...	(2)	0 (2)	0 (2)	1,6 (2)	2,811	0
Irish Free State	...	...	...	...	(2)	0 (2)	0 (2)	2,778	29	8,047
Finland	...	...	18	7	...	...	104	55	...	137
France	7	2	1,451	604	33	13	9,912	8,895	46	17,357
Gr. Brit. and N. Ir.	134	203	2,319	2,194	1,146	805	23,900	10,910	2,150	36,306
Greece	...	...	49	9	...	...	101	132	...	185
Italy	2	0	1,345	1,290	4	4	6,993	7,776	7	15,252
Norway	...	...	278	285	...	...	1,907	1,202	...	2,076
Netherlands	15	53	1,804	1,953	174	295	14,052	12,308	626	23,177
Poland	0	0	29	15	0	0	1,050	130	...	392
Portugal	...	...	64	18	...	...	3,025	1,040	...	1,442
Sweden	...	...	584	212	...	...	1,631	1,338	...	2,542
Switzerland	0	0	211	139	0	0	5,247	2,584	2	5,443
Czechoslovakia	0	0	1,232	441	0	0	2,141	4,284	...	7,573
Canada	0	0	187	390	...	2	794	820	...	1,486
Japan	...	...	216	256	...	...	240	0	...	0
Tunis	2	0	35	0	2	2	...	...	2	0
Totals	17,321	9,498	12,141	11,418	85,413	66,385	96,184	84,548	168,694	169,636

(1) (2) (3) See notes page 359.

COUNTRIES	APRIL				FOUR MONTHS (January 1-April 30)				TWELVE MONTHS (January 1-Dec. 31)	
	EXPORTS		IMPORTS		EXPORTS		IMPORTS		EXPORTS	IMPORTS
	1931	1930	1931	1930	1931	1930	1931	1930	1930	1930
Rice. — Thousand centals (1 cental = 100 lbs.)										
<i>Exporting Countries:</i>										
Spain	...	...	...	...	(2)	146 (2)	342 (2)	0 (2)	0	1,252
Italy	254	313	11	11	1,329	1,385	13	22	4,716	134
United States	205	157	49	33	1,064	917	176	159	2,621	298
India	5,529	8,983	24	7	18,144	28,614	93	18	57,318	139
Indo-China	...	...	...	...	(2)	4,548 (2)	8,217	...	...	24,727
Siam	2,504	2,601	...	...	...	9,255	9,500	...	...	20,508
Egypt	...	...	...	...	(2)	267 (2)	331 (2)	24 (2)	90	1,206
<i>Importing Countries:</i>										
Germany	77	93	642	500	245	390	1,391	1,274	1,594	5,503
Austria	0	0	60	40	0	0	212	194	0	606
Belgium	11	0	128	53	49	2	359	251	9	1,047
Denmark	0	0	9	9	0	0	46	44	0	139
Estonia	...	...	2	2	...	...	9	11	...	35
Irish Free State	...	...	...	...	(2)	0 (2)	0 (2)	15 (2)	13	0
France	121	165	522	443	322	714	1,519	1,561	1,903	5,650
Gr. Brit. and N. Ir.	20	20	223	212	75	77	741	683	218	2,564
Greece	...	...	51	40	...	...	170	161	...	536
Hungary	0	0	62	4	0	4	143	62	9	388
Latvia	...	...	...	...	(2)	0 (2)	2 (2)	26 (2)	7	62
Lithuania	0	0	0	2	0	0	9	9	0	31
Norway	...	...	20	0	...	...	44	20	...	101
Netherlands	192	170	421	761	734	593	840	990	2,035	3,563
Poland	13	4	7	168	35	15	11	333	126	1,177
Portugal	...	...	71	88	...	...	168	267	...	941
Sweden	...	...	0	11	...	...	0	11	...	161
Switzerland	0	0	37	26	0	0	141	108	0	408
Czechoslovakia	0	0	62	79	0	0	203	227	0	979
Yugoslavia	0	0	40	33	2	0	154	106	2	516
Canada	0	0	55	53	...	...	278	240	0	584
Chile	...	...	...	...	...	...	(2)	139 (2)	172	...
Ceylon	0	0	833	1,074	...	...	3,622	4,116	9	10,809
Java and Madura	...	...	...	...	(2)	37 (2)	2 (2)	2,207 (2)	3,770	117
Japan	327	20	258	308	1,618	40	778	1,503	1,262	8,973
Syria and Lebanon	...	...	...	...	(2)	0 (2)	0 (2)	57 (2)	77	2
Turkey	...	...	...	...	(2)	0 (2)	0 (2)	40 (2)	44	2
Algeria	0	0	18	9	0	0	46	40	9	104
Tunis	0	0	1	2	0	0	11	7	0	24
Union of S. Africa	...	...	...	...	(3)	0 (3)	0 (3)	82 (3)	70	0
Australia	...	...	...	...	(2)	31 (2)	20 (2)	11 (2)	18	71
New Zealand	...	...	...	...	(2)	0 (2)	0 (2)	13 (2)	15	0
Totals	9,453	12,416	3,609	4,046	31,995	51,169	13,890	16,771	119,865	48,363
Linseed. — Thousand centals (1 cental = 100 lbs.)										
<i>Exporting Countries:</i>										
Estonia	0	0	0	0	2	2	0	0	56	2
Lithuania	9	2	0	0	112	53	0	0	443	...
Argentina	4,517	2,286	...	...	19,476	12,804	...	...	25,490	...
India	280	558	0	0	556	939	0	0	5,763	0
Tunis	0	0	0	0	0	0	0	0	9	0
<i>Importing Countries:</i>										
Germany	0	7	1,292	472	4	13	3,375	1,922	26	5,194
Belgium	...	11	293	251	31	40	1,318	593	68	1,676
Denmark	13	...	64	62	...	...	161	130	...	359
Spain	...	...	...	...	...	...	(2)	97 (2)	68	419
Finland	0	0	...	7	0	0	29	20	0	79
France	2	0	701	307	11	7	1,742	1,124	15	4,288
Gr. Brit. and N. Irel.	0	0	719	218	2	4	2,950	1,821	9	5,031
Greece	0	0	4	2	0	0	24	11	2	64
Hungary	2	2	0	44	4	7	2	71	143	106
Italy	0	0	130	73	0	0	375	256	0	1,175
Latvia	...	...	...	...	(2)	37 (2)	31 (2)	18 (2)	31	236
Norway	...	...	33	44	...	...	168	132	...	357
Netherlands	11	24	1,398	688	33	97	3,587	1,060	146	5,617
Poland	0	2	60	7	4	15	93	53	31	150
Sweden	...	...	104	88	...	...	342	234	...	798
Czechoslovakia	0	0	75	86	2	4	146	126	18	445
Yugoslavia	0	0	2	15	0	2	46	29	2	121
Canada	0	2	0	66	2	4	0	227	783	454
United States	...	...	468	1,415	...	...	1,929	5,104	...	7,090
Japan	...	...	22	11	...	...	08	26	...	128
Australia	...	...	...	...	(2)	0 (2)	0 (2)	143 (2)	106	0
Totals	4,834	2,894	5,364	3,946	26,276	14,622	16,613	13,324	33,215	34,639

(2) (3) See notes page 359.

COUNTRIES	APRIL				FOUR MONTHS (January 1-April 30)				TWELVE MONTHS (January 1-Dec. 31)	
	EXPORTS		IMPORTS		EXPORTS		IMPORTS		EXPORTS	IMPORTS
	1931	1930	1931	1930	1931	1930	1931	1930	1930	1930
Butter. — (Thousand lbs.)										
<i>Exporting Countries:</i>										
Austria	77	128	84	57	1,153	1,563	110	77	4,112	545
Denmark	34,181	29,597	216	249	120,869	115,269	412	450	372,558	1,389
Estonia	1,859	1,638	0	0	5,736	5,483	0	0	31,010	0
Irish Free State	—	—	—	—	(2) 750	(2) 1,744	(2) 3,067	(2) 2,425	58,815	3,391
Finland	4,546	4,537	0	0	14,941	15,027	0	0	37,720	7
France	650	719	6,759	1,812	3,038	2,780	23,722	8,042	12,095	12,924
Hungary	80	22	0	0	540	977	0	0	3,430	40
Latvia	—	—	—	—	(2) 6,175	(2) 6,718	(2) 11	(2) 11	40,630	49
Lithuania	1,098	560	0	0	3,131	1,953	0	0	18,219	0
Netherlands	7,657	8,849	207	293	22,046	23,080	2,000	1,204	92,394	4,396
Poland	1,808	1,312	0	7	6,821	6,182	2	9	26,714	29
Sweden	3,695	4,762	0	4	16,585	21,462	2	7	58,857	18
U. S. S. R.	—	—	—	—	—	—	—	—	23,149	—
Argentina	5,009	4,656	—	—	25,100	20,435	—	—	51,156	—
India	22	40	22	20	148	240	95	84	551	282
Syria and Lebanon	—	—	—	—	(2) 470	(2) 421	(2) 18	(2) 22	2,161	172
Australia	—	—	—	—	(2) 55,237	(2) 42,261	(2) 0	(2) 0	126,411	2
New Zealand	—	—	—	—	(2) 71,807	(2) 76,360	—	—	208,170	—
<i>Importing Countries:</i>										
Germany	24	86	16,001	21,264	99	220	65,440	83,011	578	293,560
Belgium	216	243	2,769	1,301	776	750	13,067	6,568	2,848	22,412
Spain	—	—	—	—	(2) 22	(2) 37	(2) 11	(2) 82	101	328
Gr. Brit. and N. Irel.	3,086	959	75,193	65,425	19,804	6,374	280,727	250,586	21,028	764,782
Greece	—	—	86	76	—	—	388	373	—	1,420
Italy	104	172	772	143	333	435	3,596	877	1,843	3,115
Norway	216	2	7	33	763	229	64	93	236	1,530
Switzerland	0	4	1,649	1,323	2	15	7,117	5,027	42	18,798
Czechoslovakia	2	42	201	33	298	430	238	44	694	714
Canada	40	42	498	2,698	214	234	2,595	26,901	1,179	38,605
United States	238	262	97	783	780	1,301	403	1,257	2,967	2,471
Ceylon	—	—	37	90	—	—	192	258	—	723
Java and Madura	—	—	—	—	—	—	(2) 2,617	(2) 2,346	—	7,557
Japan	—	—	18	66	—	—	97	322	—	611
Algeria	4	9	531	320	24	24	1,362	1,288	82	3,322
Egypt	—	—	—	—	(2) 2	(2) 2	(2) 597	(2) 756	42	2,417
Tunis	0	0	75	68	0	2	306	313	13	829
Totals	64,536	58,641	165,226	96,964	317,964	357,629	408,256	401,433	1,197,671	1,196,336
Cheese. — (Thousand lbs.)										
<i>Exporting Countries:</i>										
Denmark	670	836	49	60	2,901	3,810	229	218	12,626	809
Finland	489	273	2	2	2,000	1,281	11	13	4,683	35
Italy	8,206	8,386	917	999	27,962	25,869	2,985	3,426	80,868	12,562
Lithuania	163	126	0	0	675	432	2	2	1,960	11
Norway	146	112	58	60	633	450	218	251	1,380	750
Netherlands	15,406	15,492	101	106	57,148	59,975	425	483	206,730	1,510
Poland	218	141	60	73	950	628	240	311	3,267	1,074
Switzerland	5,141	6,268	582	425	19,253	21,718	2,022	1,550	66,146	4,251
Czechoslovakia	534	597	324	287	2,784	1,878	946	831	8,274	2,983
Yugoslavia	132	121	22	31	935	503	84	106	4,583	300
Canada	505	229	99	99	2,220	2,518	423	527	66,955	1,779
Australia	—	—	—	—	(2) 1,554	(2) 1,345	(2) 9	(2) 68	7,273	160
New Zealand	—	—	—	—	(2) 75,409	(2) 68,480	(2) 2	(2) 0	201,256	7
<i>Importing Countries:</i>										
Germany	397	390	9,158	9,244	2,019	1,830	35,834	39,106	5,410	137,459
Austria	448	181	937	642	1,501	739	1,863	1,781	4,482	5,637
Belgium	62	60	3,696	3,704	240	234	15,077	14,892	890	51,394
Spain	—	—	—	—	(2) 51	(2) 183	(2) 851	(2) 1,226	373	5,836
Irish Free State	—	—	—	—	(2) 31	(2) 40	(2) 635	(2) 608	194	2,350
France	1,523	4,112	6,190	4,579	12,231	14,282	24,749	18,457	38,921	65,524
Gr. Brit. and N. Irel.	514	858	27,168	30,525	2,363	2,987	115,483	120,088	8,927	348,592
Greece	42	31	368	165	73	88	1,118	1,149	262	2,302
Hungary	13	9	11	37	51	22	99	157	98	886
Portugal	—	—	55	82	—	—	154	220	—	1,010
Sweden	—	—	141	139	—	—	503	443	—	1,470
United States	134	220	6,471	7,125	677	825	19,266	22,128	2,130	68,813
India	0	0	46	79	0	2	328	340	7	1,183
Java and Madura	—	—	—	—	—	—	(2) 313	(2) 344	—	1,671
Syria and Lebanon	—	—	—	—	(2) 20	(2) 22	(2) 170	(2) 190	132	780
Algeria	35	18	1,074	1,001	77	79	2,826	3,948	212	10,397
Egypt	—	—	—	—	(2) 26	(2) 22	(2) 1,123	(2) 1,944	60	7,558
Tunis	4	0	117	165	7	4	626	589	29	1,746
Totals	34,798	38,469	57,391	59,719	213,791	216,226	223,612	225,996	728,126	728,704

(2) See notes page 359.

COUNTRIES	APRIL				NINE MONTHS (August 1-April 30)				TWELVE MONTHS (August 1-July 31)	
	Exports		Imports		Exports		Imports		Exports	Imports
	1931	1930	1931	1930	1930-31	1929-30	1930-31	1929-30	1929-30	1929-30
Cotton. — Thousand centals (1 cental = 100 lbs.)										
<i>Exporting Countries:</i>										
United States . . .	2,132	1,887	86	337	31,306	32,792	344	1,554	5,927	1,889
Argentina . . .	31	49	—	—	258	262	—	—	597	—
Brazil . . .	—	—	—	—	(a) 443	(a) 1,200	—	—	1,351	—
India . . .	1,210	1,671	223	77	11,087	11,843	1,146	311	15,172	600
Egypt . . .	—	—	—	—	(a) 4,557	(a) 4,908	(a) 0	(a) 0	1,367	0
<i>Importing Countries:</i>										
Germany . . .	130	143	714	686	1,292	1,400	6,715	7,441	1,885	8,944
Austria . . .	0	0	33	40	0	2	359	434	2	562
Belgium . . .	15	9	163	190	130	84	1,305	1,528	106	2,087
Denmark . . .	—	—	11	11	—	—	115	110	—	146
Spain . . .	—	—	—	—	(a) 15	(a) 37	(a) 1,543	(a) 1,528	44	2,207
Estonia . . .	0	0	4	7	0	0	64	110	0	130
Finland . . .	0	0	11	7	0	0	189	112	2	143
France . . .	44	53	703	692	412	467	6,894	6,887	668	3,272
Gr. Brit. and N. Ire. .	20	86	708	753	340	452	9,986	11,127	769	13,181
Greece . . .	—	0	13	4	—	2	150	51	—	85
Hungary . . .	—	—	20	20	—	—	212	225	—	291
Italy . . .	0	0	324	430	2	9	2,937	4,087	9	5,148
Latvia . . .	—	—	—	—	(a) 0	(a) 0	(a) 49	(a) 80	0	77
Norway . . .	—	—	2	2	—	—	42	40	—	46
Netherlands . . .	0	0	108	75	4	4	802	787	7	1,027
Poland . . .	2	4	130	77	15	22	1,107	922	26	1,215
Portugal . . .	—	—	35	35	—	—	271	315	—	401
Sweden . . .	—	—	31	42	—	—	335	403	—	516
Switzerland . . .	0	0	42	40	0	0	487	581	0	639
Czechoslovakia . . .	11	11	194	212	119	134	1,870	2,110	170	2,701
Yugoslavia . . .	0	0	9	13	0	0	139	154	0	188
Canada . . .	—	—	64	53	—	—	838	871	—	1,043
Japan . . .	29	57	1,922	1,100	353	236	10,615	10,602	417	13,082
Algeria . . .	2	4	0	0	11	24	2	2	33	4
Totals . . .	3,626	3,974	5,553	4,977	51,424	53,968	47,466	52,392	63,554	64,567

Wool. — (Thousand lbs.)

COUNTRIES	APRIL				NINE MONTHS (August 1-April 30)				TWELVE MONTHS (August 1-July 31)	
	Exports		Imports		Exports		Imports		Exports	Imports
	1931	1930	1931	1930	1930-31	1929-30	1930-31	1929-30	1929-30	1929-30
Wool. — (Thousand lbs.)										
<i>Exporting Countries:</i>										
Spain . . .	—	—	—	—	(a) 2,650	(a) 5,119	(a) 4,292	(a) 1,601	8,002	5,781
Irish Free State . . .	—	—	—	—	(a) 3,809	(a) 6,323	(a) 362	(a) 586	10,249	994
Hungary . . .	148	154	203	168	1,693	2,083	1,336	1,107	10,013	1,501
Argentina . . . (a)	59,700	28,104	—	—	245,316	181,154	—	—	277,391	—
Chile . . . (b)	—	545	—	—	—	4,473	—	—	6,206	—
India . . .	—	—	—	—	(a) 36,566	(a) 15,679	—	—	20,318	—
Syria and Lebanon . . .	6,027	2,884	549	679	23,482	33,248	1,424	2,718	47,825	4,189
Algeria . . .	—	—	—	—	(a) 4,568	(a) 6,025	(a) 1,773	(a) 503	7,485	1,810
Egypt . . .	866	463	66	132	10,715	6,023	573	690	14,997	1,975
Tunis . . .	44	13	29	75	(a) 1,431	(a) 1,585	(a) 2	(a) 0	2,533	2
Un. of S. Africa . . . (a)	—	—	—	—	(a) 182,100	(a) 199,327	(a) 398	(a) 0	288,877	0
Australia . . . (a)	—	—	—	—	(a) 2,213	(a) 3,430	(a) 443	(a) 205	7,401	298
New Zealand . . . (a)	—	—	—	—	(a) 595,193	(a) 482,435	(a) 1,030	(a) 2,269	738,152	2,837
Importing Countries:										
Germany . . . (a)	730	1,288	43,065	30,105	6,737	9,509	215,335	173,291	11,188	294,117
Austria . . . (b)	1,281	1,082	3,924	2,176	8,360	10,922	20,448	18,054	14,996	28,809
Belgium . . . (a)	11	31	1,451	1,892	207	205	9,034	10,609	366	15,655
Denmark . . . (a)	—	—	—	—	(a) 7,163	(a) 5,587	(a) 68,216	(a) 88,611	9,006	166,963
Finland . . . (b)	—	—	—	—	(a) 12,586	(a) 15,181	(a) 2,449	(a) 2,291	25,046	4,945
France . . .	18	7	174	366	64	108	2,456	2,515	130	3,413
Gr. Britain and N. Ir. .	24	0	247	183	44	78	1,676	1,197	86	1,929
Greece . . .	5,961	4,808	60,010	53,423	36,061	39,659	317,923	325,055	55,911	548,320
Italy . . . (a)	48,425	36,467	131,580	85,017	199,182	217,665	587,055	530,225	333,774	779,872
Norway . . . (a)	291	117	262	172	218	238	1,872	1,530	659	2,714
Netherlands . . . (a)	317	53	924	516	1,517	1,306	7,134	2,112	10,582	9,778
Poland . . . (b)	73	33	527	516	247	373	4,568	3,834	527	6,237
Sweden . . .	276	454	4,921	1,343	1,841	2,544	22,121	20,100	3,338	34,743
Switzerland . . .	—	—	2,681	1,704	—	—	10,144	10,589	—	15,741
Czechoslovakia . . .	42	2	1,967	1,698	220	20	13,029	12,430	55	19,178
Yugoslavia . . .	201	90	3,948	4,645	981	1,385	20,622	22,611	2,273	36,149
Canada . . .	0	0	697	553	24	40	6,557	3,344	84	6,676
United States . . .	53	187	1,404	970	1,149	3,913	8,300	6,898	6,191	9,778
Japan . . .	229	280	21,257	17,816	1,010	1,594	99,336	160,217	2,017	203,681
Totals . . .	125,347	76,973	398,514	236,736	1,565,679	1,415,901	1,601,143	1,532,669	2,161,939	2,421,459

(a) = Wool, greasy; (b) = Wool, scoured.
(3) See notes page 359.

COUNTRIES	TEN MONTHS (July 1-April 30)					COUNTRIES	TEN MONTHS (July 1-April 30)				
	1931	1930	1930-31	1929-30	1928-29		1931	1930	1930-31	1929-30	1928-29
Coffee. (Thousand lbs.)						Tea. (Thousand lbs.)					
Exports.						Exports.					
<i>Exporting Countries:</i>						<i>Exporting Countries</i>					
Brazil . . . . .	...	...	31,682,591	21,574,326	1,995,631	Ceylon	23,850	22,328	195,645	201,391	251,286
India	3,651	6,702	20,446	22,306	31,098	India	4,341	7,593	323,000	345,726	370,146
Java and Madura .	...	...	(2) 31,520	(2) 47,269	55,618	Java and Madura .	...	...	(2) 116,570	(2) 115,373	154,582
						Japan	1,545	172	10,639	21,184	24,835
<i>Importing Countries:</i>						<i>Importing Countries:</i>					
Germany	73	37	1,080	377	470	Belgium	2	2	24	22	26
Belgium	794	126	3,505	897	1,041	Irish Free State .	...	...	(2) 126	(2) 150	196
France	0	0	50	20	25	France	4	4	33	53	57
Netherlands . . .	1,532	1,464	15,587	18,265	21,208	Gr. Brit. and N. Ir.	9,046	6,962	71,470	81,203	95,771
Portugal	33	64	456	470	571	Netherlands . . .	9	4	90	42	53
Switzerland	57	15	289	168	227	United States . . .	35	71	414	498	542
Canada	2	4	46	66	79	Syria and Lebanon .	...	...	(2) 11	(2) 24	20
United States . . .	1,649	1,290	18,865	14,551	10,151	Algeria	2	0	20	18	18
Ceylon	2	51	225	595	719	Union of S. Africa .	...	...	(3) 46	(3) 55	79
Syria and Lebanon .	...	...	(2) 44	(2) 75	82	Australia . . . . .	...	...	(2) 602	(2) 1,202	1,702
Australia . . . . .	...	...	(2) 44	(2) 55	62	New Zealand . . . .	...	...	(2) 88	(2) 71	73
Totals					2,123,639	Totals	38,840	31,136	128,968	167,012	899,385
Imports.						Imports.					
<i>Importing Countries:</i>						<i>Importing Countries</i>					
Germany	37,684	19,123	301,003	278,562	313,803	Germany	1,316	304	11,169	11,918	12,807
Austria	1,841	1,084	17,271	16,638	20,064	Austria	93	86	1,107	1,109	1,228
Belgium	11,651	8,065	90,951	79,014	94,962	Belgium	51	53	529	500	617
Bulgaria	179	95	1,418	1,482	1,735	Denmark	98	106	1,074	996	1,195
Denmark	5,099	4,910	51,154	47,351	58,513	Spain . . . . .	...	...	(2) 212	(2) 225	317
Spain . . . . .	...	...	(2) 30,293	(2) 36,674	54,718	Estonia	0	0	121	126	148
Estonia	22	20	254	258	298	Irish Free State . .	...	...	(2) 18,748	(2) 17,851	23,310
Irish Free State . .	...	...	(2) 348	(2) 344	463	Finland	33	29	227	236	278
Finland	2,294	3,234	34,104	31,017	38,014	France	357	302	2,094	2,842	3,305
France	38,394	32,554	335,714	318,966	385,618	Gr. Britain and N.					
Gr. Britain and N.						Ireland	26,422	25,036	485,508	493,537	553,356
Ireland	3,726	4,114	31,586	29,648	36,090	Greece	33	24	580	529	584
Greece	1,204	1,184	10,705	10,238	12,452	Hungary	33	18	580	675	714
Hungary	573	701	5,770	6,027	8,128	Italy	20	33	260	282	337
Italy	8,408	8,358	81,915	85,705	102,637	Latvia . . . . .	...	...	(2) 132	(2) 168	208
Latvia . . . . .	...	...	(2) 282	(2) 265	335	Lithuania	9	24	152	152	174
Lithuania	401	49	419	388	429	Norway	37	20	322	317	375
Norway	3,840	4,861	31,180	28,795	34,335	Netherlands	2,895	2,271	27,282	24,557	29,390
Netherlands	8,248	7,826	85,092	82,054	98,986	Poland	381	421	3,951	3,818	4,434
Poland	1,680	1,067	14,674	14,897	17,668	Portugal	57	40	514	571	686
Portugal	1,069	761	9,555	8,190	9,978	Rumania . . . . .	...	...	(1) 578	(1) 694	1,118
Rumania . . . . .	...	...	(1) 5,401	(1) 5,093	9,005	Sweden	86	90	785	743	877
Sweden	8,554	8,159	82,206	82,418	99,162	Switzerland	168	152	1,429	1,318	1,567
Switzerland	3,452	2,877	24,793	25,298	31,017	Czechoslovakia . .	86	88	1,321	1,283	1,396
Czechoslovakia . .	2,339	2,793	23,579	25,120	31,458	Yugoslavia	18	11	571	723	776
Yugoslavia	996	1,283	17,436	19,189	21,713	Canada	3,391	2,454	39,454	31,817	46,707
Canada	2,282	1,576	26,542	22,831	29,013	United States . . .	6,184	5,796	76,062	75,101	80,380
United States . . .	148,654	140,642	1,404,894	1,308,955	1,592,080	Chile . . . . .	...	...	(2) 3,845	(2) 3,882	5,121
Chile . . . . .	...	...	(2) 7,174	(2) 9,412	12,597	Syria and Lebanon .	...	...	(2) 315	(2) 304	315
Ceylon	161	168	2,824	2,681	3,150	Turkey . . . . .	...	...	(2) 1,634	(2) 1,623	2,080
Japan	375	375	3,616	3,239	4,004	Algeria	247	170	2,460	2,141	2,524
Syria and Lebanon .	...	...	(2) 2,066	(2) 1,850	2,504	Egypt . . . . .	...	...	(2) 8,710	(2) 14,189	14,978
Turkey . . . . .	...	...	(2) 4,564	(2) 9,804	12,577	Tunis	238	203	2,324	2,601	3,144
Algeria	3,067	1,918	25,576	22,011	26,853	Union of S. Africa .	...	...	(3) 8,016	(3) 7,648	11,091
Egypt . . . . .	...	...	(2) 9,775	(2) 26,480	27,061	Australia . . . . .	...	...	(2) 37,741	(2) 34,409	50,784
Tunis	167	159	2,436	3,102	3,470	New Zealand . . . .	...	...	(2) 10,296	(2) 9,883	12,461
Un. of S. Africa . .	...	...	(3) 21,544	(3) 20,840	30,363	<i>Exporting Countries:</i>					
Australia . . . . .	...	...	(2) 1,909	(2) 3,023	4,253	India	454	545	5,368	8,746	9,828
New Zealand . . . .	...	...	(2) 302	(2) 284	450	Java and Madura . .	...	...	(2) 9,681	(2) 12,218	14,017
<i>Exporting Countries:</i>						Totals	42,720	38,365	166,661	173,732	899,495
India	300	591	3,018	6,177	6,658						
Totals	296,319	259,753	2,827,093	2,675,549	3,208,487						

(1) (2) (3) See notes page 359.

COUNTRIES					COUNTRIES				
APRIL		SEVEN MONTHS (Oct. 1 - April 31)		TWELVE MONTHS (Oct. 1 - Sept. 30)	APRIL		NINE MONTHS (August 1 - April 30)		TWELVE MONTHS (August 1 - July 31)
1931	1930	1930-31	1929-30	1929-30	1931	1930	1930-31	1929-30	1929-1930
Cacao. (Thousand lbs.).					Total Wheat and Flour (*)				
EXPORTS.					a) NET EXPORTS				
<i>Exporting Countries:</i>					<i>Exporting Countries:</i>				
Grenada . . . . .	...	(2) 4,976	(2) 5,913	9,074	Bulgaria	476	(5) 1,724	(5) (5)	
Dominican Republ. . . . .	...	(2) 12,231	(2) 13,038	42,560	Spain . . . . .	...	(2) 64	(5) (5)	
Brazil . . . . .	...	(2) 87,493	(2) 111,896	182,486	Hungary	320	1,063	9,125	14,335
Ecuador	2,231	6,737	15,276	20,785	Lithuania	68	4	531	20
Venezuela . . . . .	...	(2) 23,368	(2) 30,599	54,492	Poland	223	44	2,161	93
Ceylon	683	470	6,169	5,675	Rumania . . . . .	...	(1) 6,601	(1) 226	1,662
Java and Madura . . . . .	...	(2) 1,102	(2) 890	2,833	U. R. S. S. . . . .	...	(7) 163,076	(7) 12,754	(7) 15,732
Cameroons . . . . .	...	(3) 21,087	(3) 18,582	24,054	Yugoslavia	77	456	2,041	12,595
Ivory Coast . . . . .	...	(4) 13,014	(4) 12,002	47,638	Canada	3,653	3,219	113,380	74,274
Gulf Coast	73,414	21,330	407,766	367,796	United States	3,047	3,794	44,840	62,731
Nigeria	2,441	10,216	105,470	100,527	Argentina	11,424	6,475	46,965	76,931
St. Thomas and Principe	2,200	2,000	14,361	23,071	Chile . . . . .	...	(2) 551	(2) 176	728
Togoland . . . . .	...	(3) 9,160	(3) 11,166	14,357	British India	(5) (5)	(5) (5)	(5) (5)	300
					Turkey . . . . .	...	(2) 201	(5) (5)	
					Algeria	88	238	5,038	2,066
					Tunis	(5) 130	1,105	2,065	3,468
					Australia . . . . .	...	(2) 51,275	(2) 24,584	36,689
Totals	82,364	43,830	245,538	142,634	Totals	19,376	15,423	346,703	273,460
									366,568
IMPORTS.					b) NET IMPORTS.				
<i>Importing Countries:</i>					<i>Importing Countries:</i>				
Germany	0	15	432	216	Germany	1,016	2,410	12,132	24,229
Belgium	31	0	340	97	Austria	802	805	5,860	7,247
France	0	0	223	37	Belgium	2,866	1,900	20,111	18,770
Netherlands	758	1,138	7,377	8,422	Bulgaria	(6)	9	(6)	801
Poland	0	0	0	11	Denmark	538	388	4,636	3,519
Czechoslovakia	0	0	13	20	Spain . . . . .	...	(6)	(2)	2,061
United States	597	1,124	5,090	5,370	Estonia	13	62	386	549
Australia . . . . .	...	(2)	37	176	Irish Free State . . . . .	...	(2)	7,961	7,557
					Finland	146	212	2,209	2,485
					France	3,664	317	21,539	11,740
					Gr. Brit. and N. Ir.	10,108	7,366	101,060	92,372
					Greece	1,329	822	10,166	9,965
					Italy	4,583	3,314	35,528	12,165
					Latvia . . . . .	...	(2)	730	981
					Norway	337	399	3,708	3,115
					Netherlands	1,920	1,023	16,286	12,948
					Portugal	64	1,082	408	2,396
					Sweden	192	190	2,463	3,336
					Switzerland	(7) 688	(7) 741	(7) 8,612	(7) 7,163
					Czechoslovakia	309	701	8,157	6,147
					Ceylon	44	51	454	445
					India	624	15	2,127	2,110
					Indochina . . . . .	...	(2)	421	467
					Japan	1,283	908	6,942	6,224
					Java and Madura . . . . .	...	(2)	871	941
					Syria and Lebanon . . . . .	...	(2)	60	549
					Turkey . . . . .	...	(6)	(2)	496
					Egypt . . . . .	...	(2)	3,918	4,993
					Tunis	53	(6)	(6)	(6)
					Union of South Afr. . . . .	...	(3)	1,409	1,739
					New Zealand . . . . .	...	(2)	2,6	161
Totals	129,818	78,381	713,666	675,346	Totals	30,519	22,675	278,546	247,361
									325,941

(*) Flour reduced to grain on the basis of the coefficient: 1,000 centals of flour = 1,333.33 centals of grain.

a) Excess of exports over imports. — b) Excess of imports over exports.

(1) Data up to 31st December. — (2) Data up to 31st March. — (3) Data up to 28th February. — (4) Data up to 31st January. —

(5) See Net Imports. — (6) See Net Exports. — (7) Wheat only.

STOCKS

STOCKS AND AVAILABLE SALEABLE SUPPLIES OF CEREALS AND POTATOES IN FARMERS' HANDS
IN GERMANY, ON APRIL, 15.

PRODUCTS	% Stocks: total production				% Available saleable quantities: total production			
	15-V-31	15-IV-31	15-V-30	15-V-29	15-V-31	15-IV-31	15-V-30	15-V-29
Winter wheat	4.7	8.7	7.3	10.0	2.4	5.3	4.1	6.1
Spring wheat	6.9	13.9	7.2	15.7	5.0	10.0	4.4	11.6
Winter rye	11.7	18.2	18.2	15.8	4.0	7.2	9.4	7.0
Winter barley	4.9	7.4	0.4	6.8	0.5	0.7	1.4	0.4
Spring barley	4.2	8.6	7.7	0.7	0.3	1.3	2.2	5.3
Oats	21.3	32.0	25.7	26.3	3.0	5.2	6.7	7.2
Potatoes	8.6	21.9	11.3	13.7	0.5	3.2	1.6	2.6

Authority: *Preisberichtstelle beim Deutschen Landwirtschaftsrat.*

VISIBLE SUPPLY OF CEREALS IN CANADA AND THE UNITED STATES (1).

PRODUCTS AND COUNTRIES	30-V-31	2-V-31	28-III-31	31-V-30	1-VI-29	30-V-31	2-V-31	28-III-31	31-V-30	1-VI-29
	1000 centals					1000 bushels				
WHEAT:										
Canada	82,116	96,450	108,150	88,681	85,301	136,890	160,750	180,250	147,801	142,168
United States	123,716	123,877	128,167	73,821	59,980	206,183	206,462	213,612	123,035	90,966
TOTAL	205,832	220,327	236,317	162,502	145,281	343,053	367,212	393,862	270,836	242,134
RYE:										
United States	5,400	5,822	7,030	6,931	3,996	9,820	10,307	12,558	12,376	7,135
OATS:										
Canada	...	...	4,674	3,674	6,088	...	...	14,607	11,481	19,026
United States (2)	...	...	6,113	4,193	3,220	...	...	19,103	13,102	10,063
TOTAL	6,646	8,564	10,787	7,867	9,308	20,769	20,763	33,710	24,583	29,089
BARLEY:										
Canada	...	...	12,962	11,287	7,176	...	...	27,004	23,515	14,951
United States (2)	...	...	3,763	2,600	2,891	...	...	7,840	5,436	6,022
TOTAL	...	...	16,725	13,886	10,067	...	...	34,844	28,951	20,973
MAIZE:										
United States (2)	6,880	11,019	12,319	6,619	8,720	12,286	19,676	21,998	11,819	15,571

Authority: *Bradstreet's* (for rye: *Grain, Seed and Oil Reporter*).

(1) Grain stored at principal interior and seaboard points of accumulation and grain in transit by canals and lakes. — (2) East of Rocky Mountains.

GRAIN AND FLOUR STOCKS AT THE PORTS OF GREAT BRITAIN AND IRELAND (1).

PRODUCTS	1-VI-31	1-V-31	1-IV-31	1-VI-30	1-VI-29	1-VI-31	1-V-31	1-IV-31	1-VI-30	1-VI-29
	1000 centals					1000 bushels				
WHEAT:										
Grain	3,624	5,400	6,990	3,744	5,136	6,040	9,000	11,800	6,240	8,560
Flour as grain	720	552	576	1,008	720	1,200	920	960	1,680	1,200
TOTAL	4,344	5,952	7,566	4,752	5,856	7,240	9,920	12,560	7,920	9,760
Maize	1,908	1,560	1,728	1,056	2,804	3,514	2,786	3,066	1,886	4,114
Barley	480	840	1,100	860	1,100	958	1,750	2,292	1,792	2,922
Oats	512	608	1,024	768	912	1,800	1,900	3,200	2,400	2,850

Authority: *Broomhall's Corn Trade News*.

(1) Imported cereals.

STOCKS OF COTTON ON HAND IN THE UNITED STATES.

LOCATION	31-V-31	30-IV-31	31-III-31	31-V-30	31-V-29	31-V-31	30-IV-31	31-III-31	31-V-30	31-V-29
	1000 centals					1000 bales (counting round as half bales)				
In consuming establishments	6,019	6,555	7,072	7,453	7,146	1,258	1,370	1,478	1,531	1,477
In public storage and at compresses	26,289	23,873	31,787	16,262	8,941	5,494	6,034	6,643	3,338	1,847
TOTAL	32,308	35,428	38,859	23,715	16,087	6,752	7,404	8,121	4,869	3,324

STOCKS OF COTTON AT BOMBAY AND AT ALEXANDRIA.

PORTS	28-V-31	30-IV-31	2-IV-31	29-V-30	30-V-29	28-V-31	30-IV-31	2-IV-31	29-V-30	30-V-29
	1000 centals					1000 bales (1 bale = 478 lbs.)				
Bombay (1)	3,789	4,024	3,693	5,023	4,628	793	842	773	1,051	968
Alexandria	4,770	4,955	(2) 5,081	(3) 3,894	2,593	998	1,037	(2) 1,063	(3) 815	542

Authorities: *East Indian Cotton Ass.* and *Alexandria General Produce Ass.*

(1) Stocks held by exporters, dealers and mills. — (2) April, 1st, 1931. — (3) May, 28, 1930.

STOCKS OF COTTON IN EUROPE.

COUNTRIES, PORTS, DESCRIPTIONS	28-V-31	30-IV-31	2-IV-31	29-V-30	30-V-29	28-V-31	30-IV-31	2-IV-31	29-V-30	30-V-29
	1000 centals					1000 bales (1 bale = 478 lbs.)				
<i>Great Britain</i> (1):										
American	2,455	2,508	2,593	1,782	3,120	514	525	543	373	655
Argentine, Brazilian, etc.	189	208	212	552	130	39	44	44	115	29
Peruvian, etc. . . .	225	236	286	227	133	47	49	60	47	28
East Indian, etc. . .	814	844	864	315	200	170	178	181	66	42
Egyptian, Sudanese	1,348	1,306	1,479	1,205	1,330	282	292	309	252	278
Other (2)	233	237	241	304	338	49	50	50	64	70
TOTAL	5,204	5,429	5,675	4,385	5,269	1,101	1,136	1,187	917	1,102
<i>Bremen</i> :										
American	2,176	2,427	2,506	1,918	1,812	455	508	524	401	379
Other	53	48	36	44	37	11	10	8	9	8
TOTAL	2,229	2,475	2,542	1,962	1,849	466	518	532	410	387
<i>La Havre</i> :										
American	1,557	1,666	1,691	990	873	326	348	354	208	183
Other	159	160	155	162	117	33	34	33	34	24
TOTAL	1,716	1,826	1,846	1,158	990	359	382	387	242	207
<i>Total Continent</i> (3):										
American	4,354	4,691	4,808	3,455	3,048	911	981	1,006	723	638
Argentine, Brazilian, etc.	107	100	90	60	54	23	21	19	14	11
E. Indian, Australian, etc.	231	244	219	148	170	48	51	46	31	36
Egyptian	101	109	102	118	76	21	23	21	24	16
W. Indian, W. African, E. African, etc.	49	52	52	95	53	10	11	11	20	11
TOTAL	4,842	5,196	5,271	3,882	3,401	1,013	1,087	1,108	812	712

Authority: *Liverpool Cotton Ass.*

(1) Data for following day. — (2) Includes: W. Indian, etc.; E. African, etc.; W. African, and Australian. — (3) Includes Bremen, Havre, and other Continental ports.

MONTHLY REVIEW OF PRICES (1)

PRODUCTS, MARKETS AND DESCRIPTIONS	June	June	May	May	Average (2)			Commercial Season	
	12,	5,	29,	22,	May	June	June	1929-30	1928-29
	1931	1931	1931	1931	1931	1930	1929		
WHEAT.									
Winnipeg: No. 1 Manitoba (cents p. 60 lbs.) . . .	60 7/8	62	60	60	60 7/8	103 7/8	110 7/8	124 7/8	124
Chicago: No. 2 Hard Winter (3) (cents p. 60 lbs.) .	n. 81	n. 78	84 1/2	83 3/4	83 3/4	98 7/8	112 1/4	114 7/8	119 1/4
Minneapolis: No. 1 Northern (cents p. 60 lbs.) .	78 7/8	73 1/4	79 1/2	79 7/8	80 7/8	98 1/4	100 1/2	117 1/2	115 1/4
New York: No. 2 Hard Winter (3) (cents p. 60 lbs.)	n. q.	n. q.	n. q.	n. q.	n. q.	104 1/2	121 1/4	121 1/4	131 1/2
Buenos Aires (a); Barletta (80 kg. p. hectol. — pesos paper per quintal)	5.95	5.90	5.95	5.95	6.02	10.35	8.75	10.05	9.08
Karachi: Karachi white, 2 % barley, 1 1/2 % dirt (trapes per 656 lbs.)	17-2-0	17-2-0	17-4-0	18-0-0	18-8-0	29-13-3	37-8-8	36-6-9	43-13-7
Berlin: Home grown (Reichsmarks p. quintal) . .	27.30	27.10	27.30	28.70	28.51	28.75	28.85	25.33	21.83
Hamburg, c. i. f. (Reichsmarks p. quintal):									
No. 3 Manitoba	(4) 11.15	10.73	10.48	11.25	11.54	18.10	20.20	21.30	21.50
No. 2 Hardwinter	10.56	10.90	10.98	11.17	n. 11.07	17.13	18.86	19.49	20.98
Barusso (79 kg. p. hectol.)	9.21	9.38	9.20	9.83	9.87	(5) 16.89	17.71	18.72	19.06
Antwerp (Belgian francs p. quintal):									
Home grown	90	96	95	97	(6) 101	158 1/2	159	154 1/4	162 1/2
No. 2 Hard Winter, Gulf	(7) 91	(7) 93 1/2	(7) 93	(7) 97	(7) 99 1/2	157 1/2	165	171	...
Paris: Home grown, 75-77 kg. (francs p. quintal) .	187.00	183.50	183.50	183.50	185.00	133.50	153.95	139.40	155.35
London: Home grown (shillings per 504 lbs.) . .	20/-	20/-	26/-	26/-	25/6	37/4	42/8	40/10	43/6
London and Liverpool c. i. f., shipping current month (shillings p. 450 lbs.):									
South Russian (on sample)	(9) 22/-	n. q.	n. q.	n. q.	n. q.	n. q.	n. q.	n. q.	n. q.
No. 3 Manitoba	21/9	22/4 1/2	(10) 23/-	(10) 23/6	(10) 23/9	38/7	42/8	45/2	45/6
No. 2 Hard Winter (3)	22/-	22/-	(11) 22/6	(11) 22/7 1/2	(11) 22/10	36/2	40/4	41/5	43/3
White Pacific	23/-	23/3	24/-	n. q.	24/8	37/3	42/4	42/3	46/-
Rosafe (63 1/2 lbs.), afloat	(12) 20/-	(12) 20/7 1/2	(12) 20/7 1/2	(12) 21/-	(12) 21/4	(13) 37/-	39/-	40/3	42/3
Choice White Karachi	23/-	22/9	23/-	24/3	24/6	38/-	n. q.	42/2	n. q.
Australian	22/9	22/0	23/3	n. 23/0	23/8	30/5	42/1	43/6	45/11
Milau (b): Home grown, soft (liras p. quintal) .	105.00	107.00	100.00	112.00	112.20	142.00	131.85	131.30	131.40
Genoa c. i. f. (shillings p. metric ton): La Plata .	95/-	100/-	100/6	110/-	(14) 107/4	174/6	169/8	184/6	192/10
RYE.									
Minneapolis: No. 2 (cents per 56 lbs.)	36	36	37	38	36 3/4	56 3/4	87	80 3/4	99
Berlin: Home grown (Reichsmarks per quintal) .	19.90	19.70	20.10	20.20	19.81	17.45	19.12	17.04	20.47
Hamburg c. i. f.: La Plata, 74-75 kg. (R. M. p. 100 kg.)	(15) 7.94	(15) n. 8.00	(15) 7.86	n. q.	n. q.	n. 8.40	17.02	14.57	19.72
Groningen (c): Home grown (florins per quintal) .	4.35	4.35	4.55	4.85	4.78	4.34	9.15	6.38	9.74
BARLEY.									
Winnipeg: No. 4 Western (cents p. 48 lbs.) . . .	31 1/4	31 1/2	29 1/4	28 7/8	29	35 1/4	67 7/8	51 7/8	67 7/8
Chicago: Feeding (cents per 48 lbs.)	31	37	36	35	38	49 1/2	54	57 3/4	56 7/8
Berlin: Home grown, fodder (Reichsmarks per quintal)	20.80	21.80	22.90	23.45	23.49	17.52	18.07	17.40	19.78
Antwerp: Danube (francs per quintal)	80	77	81	84 1/2	(16) 84	75 1/2	144 1/2	107 1/2	154 1/2
London: English malting (shillings p. 448 pounds).	32/6	32/6	32/6	32/6	32/6	31/-	42/6	39/-	47/8
London and Liverpool, c. i. f., parcels (shillings per 400 lbs.):									
Danubian 3 %	17/6	17/6	17/6	18/9	18/1	15/1	29/5	22/3	32/6
Russian (Aroff-Black sea)	(17) 15/3	n. q.	(17) 17/-	(17) 17/6	(17) n. 17/3	14/10	n. q.	18/11	n. q.
Canadian Western, No. 4	(18) 16/1 1/2	(18) 16/1 1/2	(18) 15/4 1/2	(18) 16/4 1/2	(18) 16/5	n. q.	29/-	n. 25/10	29/4
Californian malting (shillings p. 448 lbs.) . .	32/6	32/6	32/6	31/0	31/8	29/3	38/10	32/6	39/9
Moroccan	n. q.	n. q.	n. q.	n. q.	n. q.	n. q.	26/7	n. 24/2	29/8
Groningen (c): Home grown winter (fl. p. quintal).	5.35	5.35	5.40	5.50	5.48	6.55	9.79	7.55	9.87

(a) Thursday prices. — (b) Saturday prices. — (c) Prices of preceding Tuesday.

(1) All quotations are, unless otherwise stated, for spots. — (2) The monthly averages are based on Friday quotations, the annual averages on the monthly. — (3) Quoted formerly as No. 2 Winter. — (4) No. 2 Manitoba. — (5) 78 kg. per hectolitre. — (6) May, 15: 104 — (7) No. 2 Hard Winter, Atlantic. — (8) May, 15: 101. — (9) North Russian. — (10) Shipping from Vancouver. — (11) Hard Winter on sample. — (12) 63 lbs. per bushel. — (13) 62 1/2 lbs. per bushel. — (14) May, 15: 111/3. — (15) 72 7/3 kg. per hectolitre. — (16) May 15: 85. — (17) Shipping August-September. — (18) No. 3 Western.

PRODUCTS, MARKETS AND DESCRIPTION	June 12, 1931	June 5, 1931	May 29, 1931	May 22, 1931	Average (1)				Commercial Season
					May 1931	June 1930	June 1929		
								1929-30	1928-29
OATS.									
Winnipeg: No. 2 White (cents per 34 lbs.) . . .	30	29 3/4	28 3/4	28 3/4	29	47 1/4	51	58 3/4	58 3/4
Chicago: No. 2 White (cents per 34 lbs.) . . .	27 1/4	28	28	28 3/4	28 3/4	39 1/2	46 3/4	44 3/4	47 3/4
Buenos Aires (a): Current quality (pesos paper per quintal)	3.30	3.70	3.70	3.95	3.94	3.97	6.66	5.30	7.71
Berlin: Home grown (Reichsmarks per quintal) . . .	18.15	18.35	19.10	19.65	19.48	15.09	18.85	15.62	19.08
Paris: Home grown, black and other (francs per quintal)	87.00	85.50	84.50	86.50	90.80	67.50	120.35	81.15	127.85
London: Home grown white (shillings per 336 lbs.) .	20/6	20/6	21/-	21/-	20/6	19/3	29/-	21/-	28/3
London and Liverpool c. i. f., parcels (shillings p. 320 lbs.): . . .									
Danubian (39-40 lbs.)	n. q.	n. q.	n. q.	n. q.	n. q.	13/-	n. q.	(2) 16/4	n. q.
Plate (f. a. q.)	10/4 1/2	10/6	10/-	10/9	11/4	11/10	21/3	16/1	23/9
White clipped American	n. q.	n. q.	n. q.	n. q.	n. q.	n. q.	n. q.	n. q.	24/2
Chilian Tawny	n. q.	11/9	12/-	12/1 1/2	12/2	13/4	21/7	17/3	24/2
Milan (b): spot (liras per quintal):									
Home grown	72.50	72.50	72.50	72.50	72.90	72.50	93.15	80.75	103.30
Foreign imported	60.50	60.50	61.50	61.50	62.50	64.00	88.65	74.25	98.60
MAIZE.									
Bralla: Danube (1c1 per quintal)	254	248	245	260	3257	282	780	309	687
Chicago: No. 2 Mixed American (cents per 56 lbs.) .	56	56 1/2	54	56	55 7/8	79 1/4	93	85 1/4	94 1/4
Buenos Aires (a): Yellow Plate (pesos paper per quintal)	3.85	3.85	3.80	3.00	3.84	5.06	7.62	6.17	8.85
Antwerp, spot (Belgian francs per quintal): . . .									
Bessarabian	74	74	80	85	(4) 84 1/2	92	n. q.	n. 97 1/4	n. q.
Cinquantino	60	67 1/2	71	88	(5) 88	129 1/2	182 1/4	131 1/4	173
Yellow Plate	64	64	66 1/2	72	(6) 77 1/4	102 1/2	141 1/2	109 1/4	155 1/4
London and Liverpool, parcels, c. i. f. (shillings per 480 lbs.):									
Danube	n. q.	n. q.	n. q.	n. q.	n. q.	22/7	n. q.	24/11	n. q.
Yellow Plate	14/9	15/-	14/6	15/3	15/9	24/3	35/3	25/3	38/3
No. 2 White African	n. q.	n. q.	n. q.	n. q.	(7) 19/10	23/4	n. q.	26/-	38/8
Milan (b): Home grown (liras per quintal) . . .	52.50	53.50	55.50	56.50	53.90	67.50	94.00	71.35	97.90
RICE (CLEANED).									
								1930	1929
Milan (b): Maratelli (lire per quintal)	117.00	117.00	124.00	130.00	128.20	104.75	198.50	152.15	195.70
Rangoon: No. 2 Burma (rupees per 7500 lbs.) . .	202 1/2	210	215	225	216	437 1/4	465	393 1/4	462 1/4
Saigon (Indochinese piastres (8) p. quintal): . .									
No. 1 Round white (25 % broken)	5.35	5.44	5.60	6.01	5.90	12.40	11.48	11.36	11.58
No. 2 Japan (40 % broken)	4.86	4.94	5.11	5.52	5.37	11.00	10.97	10.89	11.08
London (a): c. i. f. (shillings per 112 lbs.): . . .									
Spanish Belloch, No. 3 oiled	18/-	18/-	12/3	12/3	12/1	14/7	17/1	14/1	17/11
Italian good, No. 6 oiled	15/3	15/3	15/3	15/6	15/4	15/1	18/9	14/11	18/9
American Blue Rose	18/3	18/3	18/3	18/3	18/1	24/-	21/1	21/9	21/10
Burma, No. 2	6/0	6/10 1/2	7/1	7/3	7/1	11/10	13/-	10/11	13/2
Saigon, No. 1	6/0	6/7 1/2	7/-	7/-	7/1	12/2	13/2	11/6	13/3
Siem, Garden, No. 1	8/1 1/2	8/1 1/2	8/4 1/2	8/6	8/7	15/7 1/2	n. q.	14/-	15/1
Tokio: Various qualities (yens per koku)	18.20	18.20	18.10	18.30	18.22	27.45	29.50	25.57	29.06
LINSEED.									
Buenos Aires (a): Current quality (pesos paper per quintal)	10.55	10.50	10.45	10.60	10.58	18.97	15.57	17.19	18.20
Antwerp: Plate (Belgian francs p. quintal) . . .	144	142	143	148	(9) 147 1/4	299	269 1/4	284 1/4	318 1/4
Hull, c. i. f.: Plate (p. sterling p. 1 ton) . . .	8-6-3	8-6-0	8-9-9	8-6-3	8-8-6	16-16-7	15-15-4	15-0-5	18-5-0
London, c. i. f.: Bombay bold (p. st. per long ton).	11-0-0	11-5-0	11-0-0	11-2-6	11-6-0	18-11-3	18-6-10	17-14-4	20-16-1
Duluth: No. 1, Northern (cents p. 56 lbs.) . . .	(10) 147 1/2	(10) 148 1/2	141 1/4	153 1/4	152 1/4	269	246 1/4	236	273 1/4

(a) Thursday prices. — (b) Saturday prices.

(1) The monthly averages are based on Friday quotations, the annual averages on the monthly. — (2) Weight not indicated. — (3) May, 15: 275. — (4) May, 15: 87 — (5) May, 15: 93 — (6) May, 15: 79 — (7) White East African. — (8) Actual rate of change: 1 piastre = 38 1/2, 9c. — (9) May, 15: 147. — (10) July delivery.

PRODUCTS, MARKETS AND DESCRIPTION	June	June	May	May	Average (1)				
	12,	5,	29	22,	May,	June,	June,	Commercial	
	1931	1931	1931	1931	1931	1930	1929	Season	
								1929-30	1928-29
COTTONSEED.									
Alexandria: Sakellaridis (piastres per ardeb) . . .	48.2	45.2	44.4	48.3	40.6	56.7	85.2	67.9	95.4
Hull: Sakellaridis (p. sterl. per long ton) . . .	5-3-9	5-0-5	4-17-6	5-1-3	5-0-3	6-2-10	8-11-8	6-18-2	9-12-2
COTTON.									
New Orleans: Middling (cents per lb.)	8.43	8.29	8.45	9.00	9.12	13.67	18.81	16.17	18.98
New York: Middling (cents per lb.)	8.70	8.60	8.75	9.25	9.40	14.50	18.72	16.00	19.09
Bombay: M. g. Broach f. g. (rupees per 784 lbs.) .	160	171	168	181	175½	226¼	334¾	283½	346¼
Alexandria (a) (talaris per kantar):									
Sakellaridis f. g. f.	12.72	13.47	14.47	14.87	14.95	27¼	32¼	28¼	35¼
Ashmouni (Upper Egypt) f. g. f.	9.55	9.70	10.05	10.65	10.84	19¼	21¼	19¼	22¼
Bremen: Middling (U. S. cents per lb.)	9.83	9.86	9.65	10.39	10.51	15.05	21.11	18.27	21.19
M. g. Broach fully good (pence per lb.)	n. 4.15	n. 4.05	n. 4.15	n. 4.30	n. 4.33	n. 5.61	n. 7.85	n. 6.88	n. 8.27
Le Havre: Middling, Gulf (francs per 50 kilogr.) .	292	297	303	316	323	467	622	546	624
Liverpool (pence per lb.):									
Middling fair	n. 5.95	n. 5.98	n. 6.00	n. 6.32	n. 6.41	n. 9.32	n. 11.54	n. 10.39	n. 11.80
Middling	4.75	4.78	4.80	5.12	5.21	7.07	10.28	9.09	10.53
Sao Paulo, good fair	4.95	4.98	5.05	5.32	5.42	7.77	10.50	9.02	10.91
M. g. Broach, fully good	n. 3.84	n. 3.95	n. 3.76	n. 3.92	n. 4.03	n. 5.42	n. 8.14	n. 6.80	n. 8.08
Sakellaridis, fully good fair	7.55	7.65	7.80	8.30	8.18	12.72	16.67	14.52	18.17
BUTTER.									
								1930	1929
Copenhagen (a) (Kr. p. 100 kg.)	194	194	194	194	193	227	287	245	303
Maastricht, auction (b): Dutch (florins p. 50 kg.)	1.39	1.31	1.29	1.31	1.30	1.57	1.92	1.70	2.09
Hamburg, auction (b): Schleswig-Holstein butter, with quality mark (R. M. per 50 kg.)	123.20	122.95	123.30	125.21	124.98	133.19	161.71	146.67	178.03
Kempten (b): Allgäu butter (Pfennige p. half kg.)	105	105	109	111	109	118	149	128	159
London (c) (shillings p. cwt.):									
British blended	140/-	140/-	140/-	140/-	140/11	154/-	186/8	158/8	196/-
Danish	122/-	122/-	122/-	122/-	122/5	138/3	173/4	153/6	186/6
Irish creamery, salted	118/-	120/-	(2) 113/-	(2) 110/-	(3) 109/8	136/-	174/1	134/10	179/4
Dutch	116/-	118/-	118/-	118/-	120/-	134/6	160/6	151/11	182/4
Argentine	117/-	117/-	115/-	114/-	114/5	133/-	169/6	135/10	174/1
Siberian	110/-	(2) 107/-	(2) 108/-	(2) 101/-	4) 101/10	126/6	164/-	n. 133/10	167/2
Australian, salted	116/-	116/-	114/-	113/-	(4) 112/5	(5) 135/9	(6) 172/-	135/9	176/-
New Zealand, salted	117/-	118/-	116/-	115/-	114/2	136/3	174/6	137/8	178/0
CHEESE.									
Milan (lire per quintal):									
Parmigiano-Reggiano, 1st quality of last year's production	1,150	1,112	1,112	1,112	(7) 1,112	1,237	1,050	1,160	1,074
Green Gorgonzola, mature, choice	625	625	625	625	(8) 631	620	817	671	829
Rome: Roman pecorino choice (lire p. quintal) . .	1,175	1,150	1,150	1,125	1,130	1,215	1,675	1,207	1,546
Alkmaar: Edam 40 + 40% butterfat, with the country's cheesemark, factory cheese, small; florins, p. 50 kg.)	33.50	33.00	33.00	33.00	(9) 32.82	30.62	46.00	40.83	47.10
Gouda (6): Gouda 45 + (whole milk cheese, with the country's cheesemark, home made; florins, p. 50 kg.)	37.50	35.00	35.00	33.00	36.20	42.00	50.00	45.56	52.45
Kempten (b): (Pfennige per half kg.):									
Soft cheese, green (20 % butterfat)	21½	21½	21½	21½	20½	20	55	27	35
Emmenthal from the Allgäu (whole milk cheese) 1st quality	98½	98½	98½	98½	98½	(12) 99	(12) 111	(12) 97	(12) 107
London (c) (shillings per cwt.):									
English Cheddar	104/-	104/-	106/-	106/-	106/-	90/-	131/-	103/4	121/9
Canadian	80/-	79/6	79/6	79/-	109/-	112/00	93/11	107/8	107/8
New Zealand	58/6	59/-	58/-	54/6	54/2	84/9	95/6	82/2	95/5
Liverpool (c): Engl. Cheshire, ungraded (sh. p. cwt.)	(13) 67/8	(13) 67/8	(13) 72/4	(13) 72/4	77/11	74/1	85/2	90/5	111/0

(a) Thursday prices. — (b) Wednesday prices. — (c) Average prices for weeks ending on preceding Wednesday.

(1) The monthly averages are based on Friday quotations, the annual averages on the monthly. — (2) Average price for the indicated Friday and preceding Thursday. — (3) Average calculated from the average prices for the Fridays and the Thursdays which precede; May, 15 and 14: 106/-, — (4) Average calculated from the average prices for the Fridays and the Thursdays which precede; May, 15 and 14: 99/6; May, 8 and 7: 99/-, — (5) Average May, 1930: 136/-. — (6) Average May 1929: 166/10. — (7) May, 15: 1,112. — (8) May, 15: 635. — (9) May, 15: 33.50. — (10) Indicated formerly as: Bodegraven. — (11) May, 15: 36.00. — (12) Average prices for all qualities. — (13) New.

THE PRICES OF AGRICULTURAL PRODUCTS IN MAY, 1931

In the following pages the index-numbers of prices of agricultural products and other price indices of interest to the farmer are given as published in the different countries. The indices collected together have been obtained according to different methods and criteria in the various countries. A detailed account of the items included in each series and the system of construction of the index-numbers may be found in the volume published especially for this purpose by the Institute, entitled « Index-numbers of prices of agricultural products and other price indices of interest to the farmer ». We refer the reader to this volume for an exact interpretation of the significance of the different series of data.

Owing to the substantial divergence which often exists in the value and significance of the indices available, much care is advisable in their utilization from an international point of view. For this reason it has been considered opportune to reproduce all the data in their original form only, without attempting to formally unite them. The latter process, by a comparison of often heterogeneous data, might easily lead to the drawing of erroneous relations and conclusions.

But in addition to the original data, and subject to the above comments, a summary table is given below.

Countries	Percentage variations in the index-numbers for May, 1931			
	compared with those for April, 1931		compared with those for May, 1930	
	Index-numbers of prices of agricultural products	General index-numbers of prices	Index-numbers of prices of agricultural products	General index-numbers of prices
Germany	+ 0.8	— 0.4	— 1.4	— 9.9
England and Wales	— 0.8	...	— 9.0	...
Argentina	+ 2.0	—	— 32.5	—
Canada	— 2.6	— 2.0	— 35.8	— 18.8
Estonia	— 1.4	—	— 26.0	—
United States	— 5.5	—	— 30.6	—
Finland	— 4.3	— 2.7	— 27.8	— 20.0
Hungary	— 2.7	— 1.2	— 13.4	— 6.7
Italy	+ 0.2	— 1.7	— 14.6	— 17.3
New Zealand	+ 6.9	—	— 27.0	—
Netherlands	— 1.4	0.0	— 7.5	— 13.5
Poland . . . . .	...	...	...	...
Yugoslavia	c) + 3.7	— 0.1	c) — 14.4	— 15.1
	d) — 2.9		d) — 26.7	

a) "Bureau of Agricultural Economics". — b) "Bureau of Labor". — c) Products of the soil. — d) Animal products.

INDEX-NUMBERS OF PRICES OF AGRICULTURAL PRODUCTS AND OF COMMODITIES BOUGHT BY THE FARMER *

COUNTRIES AND CLASSIFICATION	May	April	March.	Febr.	Jan.	Dec.	May	May	Year	
	1931	1931	1931	1931	1931	1930	1930	1929	1930 (1)	1929
GERMANY (Statistisches Reichsamt) 1913 = 100.										
Foodstuffs of vegetable origin	131.8	129.7	121.0	114.1	111.6	111.3	113.1	124.7	115.3	126.3
Livestock	83.9	83.3	86.7	90.6	97.5	104.4	110.2	125.1	112.4	126.6
Livestock products	102.5	105.7	113.0	119.9	119.4	126.6	103.7	130.2	121.7	142.1
Feeding stuffs	120.0	113.9	102.7	93.0	90.9	91.1	95.6	133.3	98.2	125.9
Total agricultural products	109.2	108.3	106.7	105.9	103.7	110.4	110.7	125.8	113.1	130.2
Fertilizers	77.2	80.1	82.7	83.1	82.3	80.5	83.3	86.9	82.4	84.5
Agricultural dead stock	130.6	131.2	132.4	133.3	134.9	136.0	140.1	141.5	139.4	141.3
General index-number	113.3	113.7	113.9	114.0	115.2	117.8	125.7	135.5	124.6	137.2
ENGLAND AND WALES (Ministry of Agriculture) Average of corresponding months 1911-13 = 100.										
Agricultural products	122	123	123	126	130	126	134	144	134	144
Feeding stuffs	87	88	85	77	78	81	98	137	96	139
Fertilizers	100	100	100	100	102	101	102	102	101	100
General index-number (2). . . . .	...	99.3	100.6	100.6	100.8	102.2	116.2	132.9	114.1	135.3
ARGENTINA (Banco de la Nación argentina) 1926 = 100.										
Cereals and linseed	54.3	51.2	53.2	54.5	53.6	56.0	90.9	89.6	82.3	100.4
Meat	80.8	93.7	94.2	94.6	91.0	90.5	115.6	110.8	110.9	113.6
Hides and skins	68.1	70.5	70.1	70.0	69.1	65.6	69.5	91.9	71.6	95.0
Wool	57.6	57.7	64.5	55.2	50.6	51.8	75.8	107.4	67.4	108.5
Dairy products	73.4	73.6	74.3	72.9	68.7	68.7	80.3	106.0	82.4	105.9
Forest products	108.7	108.7	108.7	108.7	108.7	108.7	107.8	111.8	107.9	111.5
Total agricultural products	62.6	61.4	63.2	63.4	61.7	63.2	92.3	95.3	85.5	102.6
CANADA (Internal Trade Branch of the Dominion Bureau of Statistics) 1926 = 100.										
Field products (grain, etc.)	48.2	47.3	44.1	45.0	42.6	43.6	81.0	82.4	70.0	93.6
Animals and animal products	76.9	82.5	84.7	87.5	92.1	93.1	109.5	110.8	102.9	112.5
Total Canadian farm products	58.9	60.5	59.3	60.9	61.1	62.3	91.7	93.0	82.3	100.7
Fertilizers	86.9	86.5	86.5	89.4	88.9	89.2	91.5	96.3	88.6	92.6
General index-number	73.0	74.5	75.1	76.0	76.7	77.8	89.9	93.4	86.6	95.6
ESTONIA (Central Bureau of Statistics) 1922 = 100.										
Commodities imported	91	90	81	83	86	83	86	97.1	83	94.6
Commodities exported	62	63	65	66	64	68	90	111.1	88	112.3
Agricultural products imported and exported	61	72	72	72	71	70	96	103.6	84	105.7

* For an explanation of the method of calculation of the index-numbers, reference should be made to the Institute's publication "Index-numbers of Prices of Agricultural Products and other Price-Indices of Interest to the Farmer" (Rome, 1930).

(1) Some data for 1930 are provisional. — (2) Calculated by the "Statist", reduced to base-year 1913 = 100.

COUNTRIES AND CLASSIFICATION	May	April	March	Febr.	Jan.	Dec.	May	May	Year	
	1931	1931	1931	1931	1931	1930	1930	1929		
									1930	1929
UNITED STATES (Bureau of Agricultural Economics) Average 1909-10 to 1913-14 = 100.										
Cereals	74	74	74	75	77	80	105	113	100	121
Fruits and vegetables	119	120	109	109	108	108	193	119	158	136
Meat animals	99	108	106	108	112	112	142	164	134	156
Dairy products	91	99	101	101	107	117	123	139	123	140
Poultry and poultry products	77	90	92	79	110	127	110	134	126	159
Cotton and cottonseed	74	78	80	78	72	73	119	143	102	145
Total agricultural products	86	91	91	90	94	97	124	136	117	138
Commodities purchased by farmers (1)	131	134	136	137	138	139	150	155	146	155
Agricultural wages (1)	—	—	127	—	—	129	(2) 162	(2) 167	152	170
UNITED STATES (Bureau of Labor) 1926 = 100.										
Grains	59.6	59.5	59.3	60.4	62.4	64.0	82.1	88.2	58.3	97.4
Livestock and poultry	64.1	70.3	70.7	69.6	75.2	76.3	93.2	110.0	69.2	106.1
Other farm products	71.5	73.4	74.2	73.7	76.0	78.1	96.5	101.7	91.1	106.6
Total farm products	67.1	70.1	70.6	70.1	73.5	75.2	93.0	102.2	83.3	104.9
Agricultural implements	94.7	94.7	94.7	94.7	94.7	94.9	95.0	98.3	95.1	97.9
Fertilizer materials	80.5	80.6	80.8	81.1	81.4	81.4	86.5	94.1	85.6	92.1
Mixed fertilizers	82.8	83.5	83.3	89.1	90.4	90.6	93.6	96.7	93.6	97.2
Cattle feed	67.9	81.2	82.1	71.6	75.0	78.2	110.3	101.6	99.7	121.6
Non-agricultural commodities	72.6	74.3	75.7	77.1	78.2	79.4	88.1	94.1	85.9	94.4
General index-number	71.3	73.3	74.5	75.5	77.0	78.4	89.1	95.8	86.3	96.5
FINLAND (Central Bureau of Statistics) 1926 = 100.										
Cereals	79	76	74	74	75	72	81	106	76	98
Potatoes	68	69	73	68	68	59	76	211	76	148
Fodder	67	71	70	62	59	58	63	67	62	69
Meat	67	66	73	73	74	72	90	106	83	103
Dairy products	71	73	74	75	73	73	76	98	84	103
Total agricultural products	71	73	75	74	74	73	82	103	82	100
General index-number	84	85	86	86	86	86	90	98	90	98
HUNGARY (Central Bureau of Statistics) 1913 = 100.										
Agricultural and livestock products . . . . .	...	84	84	80	79	78	84	120	—	—
General index-number . . . . .	...	93	94	92	91	90	96	123	—	—
ITALY (Consiglio Provinciale dell'Economia di Milano) 1913 = 100.										
National agricultural products	357.20	356.36	345.90	343.75	347.90	356.88	418.45	523.50	413.89	508.76
General index-number	347.16	353.10	356.18	357.92	361.86	368.63	419.90	484.62	411.04	480.69
NEW ZEALAND (Census and Statistics Office) Average 1909-13 = 100.										
Dairy produce	93.6	89.4	104.3	102.0	98.8	102.5	122.6	134.4	120.7	145.7
Meat	116.5	128.1	125.4	142.4	147.0	160.0	164.9	175.5	164.7	178.9
Wool	76.7	76.6	60.8	55.7	62.3	59.3	96.6	172.0	100.7	170.9
Hides, skins, and tallow	95.1	84.0	78.4	96.0	93.2	122.6	165.5	213.2	145.4	188.6
Miscellaneous	130.7	134.1	144.0	122.9	118.8	129.8	133.6	140.8	134.0	146.7
Total agricultural products	96.2	90.0	95.1	97.2	96.7	101.8	131.8	162.9	126.7	161.3

(1) 1910-14 = 100. — (2) April.

COUNTRIES AND CLASSIFICATION	May	April	March	Feb.	January	Dec.	May	May	Year	
	1931	1931	1931	1931	1931	1930	1930	1929	1930 (1)	1929
NORWAY (Kgl. Selskap for Norges Vel) Average 1909-14 = 100.										
Cereals	107	106	104	104	102	99	129	171	(2) 108	(2) 155
Potatoes	157	167	181	181	180	158	121	128	(2) 152	(2) 120
Pork	73	74	81	84	89	98	114	143	(2) 106	(2) 141
Other meat	166	162	172	182	184	193	206	200	(2) 198	(2) 190
Eggs	83	85	124	101	107	146	97	111	(2) 121	(2) 185
Dairy products	124	133	135	138	139	150	148	148	(2) 150	(2) 161
Concentrated feeding stuffs	108	111	108	103	107	111	128	160	(2) 117	(2) 148
Maize	85	85	83	81	89	93	115	164	(2) 103	(2) 148
Fertilizers	96	96	96	96	96	95	105	101	(2) 101	(2) 108
NETHERLANDS (Directie van den Landbouw) Average 1924-25 to 1928-29 = 100.										
Products of the soil	83	78	71	66	62	59	55	71	(3) 68	(3) 87
Animal products	72	74	74	74	74	74	88	101	(3) 95	(3) 98
Total agricultural products	74	75	73	72	71	71	80	94	(3) 88	(3) 95
Agricultural wages	95	95	100	100	100	100	100	100	(3) 100	(3) 100
General index-number (4)	69.0	60.0	60.7	70.4	71.0	72.4	70.8	96.1	79.2	96.1
POLAND (Central Bureau of Statistics) 1927 = 100.										
Products of the soil . . . . .	...	64.7	50.8	45.8	44.3	46.4	50.8	71.5	52.2	73.1
Products of agricultural industry . . . . .	...	75.4	63.4	59.8	59.3	63.6	71.0	79.4	60.0	80.0
Total products of plant origin . . . . .	...	70.3	57.1	52.6	51.5	54.6	60.3	75.4	60.6	76.9
Animals . . . . .	...	55.9	58.0	58.9	54.9	66.6	87.7	97.4	82.3	88.4
Dairy products . . . . .	...	61.0	74.0	80.1	83.1	91.9	74.4	99.2	81.3	102.9
Total products of animal origin . . . . .	...	58.5	64.8	67.7	66.2	78.2	81.6	98.3	81.9	100.2
Total agricultural products . . . . .	...	64.5	59.8	58.2	50.9	63.2	68.3	84.2	68.5	85.7
Fertilizers . . . . .	...	124.7	124.7	124.7	124.7	124.7	105.0	130.6	121.7	126.5
Industrial products . . . . .	...	83.5	84.2	84.4	84.1	86.9	96.3	104.1	94.2	103.3
General index-number . . . . .	...	75.1	73.1	72.4	71.6	76.2	83.3	95.4	82.4	95.7
YUGOSLAVIA (National Bank of the Kingdom of Yugoslavia) 1926 = 100.										
Products of the soil	80.5	77.6	73.3	73.5	71.7	72.5	94.0	127.6	89.3	118.6
Animal products	73.2	75.4	77.4	78.1	82.0	86.4	99.9	110.0	96.3	107.2
Industrial products	73.0	73.9	72.6	72.1	72.8	75.2	81.0	94.6	81.8	92.6
General index-number	75.4	75.5	74.8	74.8	75.7	78.0	88.8	104.0	86.0	100.6

(1) Most data for 1930 are provisional. — (2) Agricultural year April 1-March 31. — (3) Agricultural year July 1-June 30. — (4) Calculated by the Central Statistical Bureau of the Netherlands, reduced to the base 1925-1929 = 100.

RATES OF FREIGHT

(Rates for full cargoes).

VOYAGES	June	June	May	May	Average			
	12,	5,	29,	22,	May	June	June	Commercial
	1931	1931	1931	1931	1931	1930	1929	Season
								1929-30 1928-29
SHIPMENTS OF WHEAT AND MAIZE.								
Danube to Antwerp/Hamburg (shill. p.	n. 13/6	n. 13/6	n. 13/6	n. 13/6	13/6	13/5	n. q.	15/8 n. 14/9
Black Sea to Antwerp/Hamburg (2240 lbs.)	n. 10/6	n. 10/6	n. 10/6	10/6	10/4	n. q.	n. q.	n. q. n. q.
St. John to Liverpool (1)	n. q.	n. q.	n. q.	n. q.	n. q.	n. q.	n. q.	1/5 3/1
Montreal to United Kingdom	n. 1/10	1/10 ½	2/-	2/3	2/2	1/9	2/1	1/10 2/10
Gulf to United Kingdom (shill. per	2/4 ½	2/3	2/5	2/3	2/2	2/-	2/9	2/6 3/4
New York to Liverpool (1) (480 lbs.)	1/6	1/6	1/6	1/6	1/6	1/6	1/6	1/6 2/3
Northern Range to U.K. and Continent	1/10 ½	1/10 ½	n. 1/10	2/-	2/-	n. q.	n. q.	1/9 2/11
North Pacific to United Kingdom (shill. per 2240 lbs.)	n. q.	n. 23/6	n. q.	n. 23/6	23/6	20/9	28/9	22/7 30/7
Vancouver to Yokohama (1) (dollars p. sh. ton)	2.85	2.85	2.85	2.85	2.79	2.75	3.25	2.78 3.85
La Plata Down River (2) to U. K./Continent	16/8	16/-	17/3	18/-	18/3	9/7 ½	22/3	12/8 22/1
La Plata Up River (3) to U. K./Continent	(shill. per							
tincent	18/-	17/6	18/9	19/6	19/9	11/1 ½	23/10	14/4 23/7
Kurachi to U. K./Continent (4) (2240 lbs.)	18/9	18/9	n. 19/9	19/9	19/6	15/10	21/5	n. 15/4 22/-
Western Australia to U.K./Continent	27/6	28/-	n. 28/9	28/9	28/8	26/3	23/8	25/7 38/7
SHIPMENTS OF RICE.								
								1930 1929
Saigon to Europe (shill. per	n. 26/3	27/-	n. 26/-	26/9	25/7	n. q.	1) n. 22/-	n. 18/11 n. 26/1
Burma to U.K./Continent (2240 lbs.)	22/6	n. q.	n. q.	n. 24/-	23/11	20/11	20/-	n. 17/8 n. q.

(1) Rates for parcels by liners. — (2) "Down River", includes the ports Buenos Aires and La Plata. — (3) "Up River", includes the ports on the Paraná River as far as San Lorenzo. Cargoes from ports beyond San Lorenzo (Colastine, Santa-Pé and Paraná) are subject to an extra rate of freight. — (4) The original data being quoted in "scale terms", 10 % is added to arrive at freights per 2,240 lbs.

IMPORT DUTIES ON CEREALS AND FLOUR

CHANGES

TO BE MADE IN THE DUTIES PUBLISHED ON PAGE 62 OF THE CROP REPORT OF JANUARY 1931.

COUNTRY	PRODUCT	Date when enforced	Original data per metric quintal	Data in Amer. cents per bushel or barrel
Germany	Wheat and rye flour	10 June 1931	R. M. 42.17	803.05
"	Wheat for manufacture of flour or groats (1)	16 " "	" 20.00	129.66
"	Barley for stock feeding (2)	16 " "	" 5.00	25.92
Estonia	Wheat (3)	25 April 1931	—	—
Lithuania	Rye flour	28 March 1931	litas 55.00	486.95
Sweden	Wheat, rye, wheat and rye flour	1 June 1931	(4)	(4)
Czechoslovakia	Rye	30 April 1931	K.C. 84.00	63.23
"	Barley	"	" 56.00	36.13
"	Oats	"	" 50.00	21.51
"	Wheat and rye flour	"	" 73.00	355.61
Czechoslovakia	Rye	8 June 1931	K.C. 68.00	51.17
"	Barley	"	" 53.00	34.20
"	Oats	"	" 38.00	16.33
"	Wheat and rye flour	"	" 121.00	318.73

(1) Duty extended to 15 July; import permitted only under customs supervision and for certain mills. — (2) Imported under customs supervision in cases of supervised purchase of marked rye, potato flakes and monopoly maize. — (3) Estonian mills have the right to import free of duty 145 kg. of wheat for each quintal of sifted flour that they export in the year following the import of the wheat. — (4) Monopoly import.

Erratum: See pag. 252 of Crop Report for April: Estonia: Sifted wheat flour.

LATEST INFORMATION

Spain. (Telegram dated 19 June) : This year's production is estimated at about 85,981,000 centals (or 143,298,000 bushels) for wheat, 11,023,000 centals (or 19,684,000 bushels) for rye, 41,888,000 centals (or 87,268,000 bushels) for barley and 13,228,000 centals (or 41,333,000 bushels) for oats.

The amounts forecast for wheat and barley are almost equal to those obtained last year ; for barley and oats they are below those of last year by about 6.6 millions centals (13.8 millions bushels) and 3.7 millions centals (11.4 millions bushels) metric tons respectively.

Greece : Copious rains and hail fell in the first days of June in Thessaly and Macedonia without, however, causing any considerable damage to cereals, of which the crop condition at the beginning of the month was very good. In Macedonia, particularly in the district of Drama, hail caused some injury to tobacco plantations. In Peloponnesus the continued rains threatened the condition of the vine but anticyptogamic treatment after each shower allowed hopes of a good output to be sustained.

Czechoslovakia : In May, especially in the latter half of the month, weather was excessively hot. In some districts very scanty rains, fell chiefly in thunderstorms. Winter cereals brairded in bad conditions, especially rye, which had previously suffered from frosts. Spring cereals, favoured by the high temperatures, had a much better appearance, but owing to the dry weather, in latter half of the month, their crop condition was somewhat lowered and varies greatly. Sugar-beet has suffered greatly from the lack of moisture, potatoes and fodder crops to a less extent. Hops are in good condition though threatened by adverse conditions.

United States. (Telegram of June 18) : Harvesting of winter wheat is proceeding under good conditions in the South-west. Beneficial rains have fallen in the Pacific North-west and in the spring wheat States but more rain is still wanted. The crop condition of maize is fairly good. In the cotton belt, the weather is generally favourable.

Japan. (Telegram of June 19) : Weather conditions during May have been unfavourable to cereals, tea, rapeseed and mulberry trees. On June 1 condition of these crops was rather bad. On June 1 silkworms were being reared under good conditions despite the not altogether favourable weather conditions during May.

AGRICULTURAL SCIENCE AND PRACTICE

MONTHLY BULLETIN

OF

AGRICULTURAL SCIENCE AND PRACTICE

GENERAL AGRONOMY

New Principles in Plant Breeding.

In countries in which agriculture is highly advanced the improvement in the more important crop plants made with the object of obtaining a high production according to the now well understood principles of selection and crossing, has reached a stage which it seems difficult to transcend if similar methods only are employed. For some years past it has been necessary in the course of experimental work and calculations of yield, to carry out the most minute observation in order to discover any real advance, and the economic results are in no way proportionate to the arduous labour of the plant-breeders.

Hence it is necessary that they should adopt different methods and discover different objects for their experimental work if they desire to make any further advance and to justify their position ; for example, they may direct their breeding work to power of resistance to pests and diseases, to special qualities and to adaptability to environment. In this field special credit is due to the Institute of Applied Botany and New Crop Plants at Leningrad, of which the Director is N. I. VAVILOF, for having discovered some quite new principles in plant breeding.

VAVILOF, taking an international stand point and following a well worked out scientific scheme, has undertaken the collection, classification and study of all types of natural or artificial plants throughout the world with the object of keeping alive all types of which the value is clearly manifest. Thus, his object is a kind of "mobilisation of the world's plant capital" and the collection and preservation of all those hereditary qualities which prevail throughout the types of all cultivated plants with the object of supplying them to practical plant-breeders.

It is a very important matter to the plant-breeder to know where the different types which will serve his purpose are to be found. According to VAVILOF, the origin of the crop plants generally grown should not be looked for in those regions where they grow in a wild state ; the place of origin of any particular cultivated plant is rather to be found in those regions where the Linnaean species to which it belongs displays the greatest abundance of types both from the point of view of morphology and physiology, and where the mountainous nature of the region and a very ancient and still primitive kind of agriculture have provided favourable conditions for the development and preservation of multiple types.

ADAMS, before VAVILOF's day, had already propounded similar views in regard to the determination of the place of origin of animal species.

A number of expeditions have been arranged for studying the question of the places of origin of crop plants. VAVILOF personally conducted research work in the Mediterranean area, North Africa, Persia, Afghanistan, Turkestan, and the regions of Khiva, Bokhara and the Pamir. Other experts were sent to Asia Minor,

Armenia, India, Ceylon, the Altai Mountains, the Far East, Africa and the Central area of South America. As the result of the discoveries made in the course of these expeditions, VAVILOF has been able to determine the principal regions in which the types are developed: viz., South Western Asia, India, China, Abyssinia, the Mediterranean area, Central and South America. There has also been noted the somewhat surprising fact that the development of types takes place in quite limited areas; thus it has been discovered that the primeval centre of origin of almost all types of the principal cultivated crop plants is situated between the Western Himalayas and the Hindoo Kooch, in an area of only a few hundreds of square kilometres. For example, in the Afghanistan pea are to be found in full force all those hereditary qualities which are exemplified in the various kinds of peas cultivated in Europe. Briefly, the most important reserve of hereditary qualities is concentrated, as a result of the relatively large number of types, in far distant regions of little economic importance, while a certain reduction in the number of types is noticeable in countries with intensive cultivation where plant-breeding is highly developed.

* During the Russian research work the first object was to determine the habitat of the different varieties of any particular botanical species, and then to discover within the district the centre where the largest number of types of these varieties is to be found, i. e., the place where the species shows the highest degree of polymorphism. According to VAVILOF the primeval centres of type development thus discovered are distinguished by dominant characteristics. Recessive characteristics which readily lend themselves to the plant-breeders' work are more likely to be found on the outskirts and even outside these development centres in quite isolated areas, as for example in oases or islands.

The Russian experiments have mainly related to wheat. The development centre of types for *Triticum vulgare* et *T. compactum* was discovered in Central Asia; for *T. durum* in Africa (Abyssinia, Egypt and Algeria). TUMANJAN recently found in the district of the Lake of Wan an important development centre of types which it would appear might prove specially valuable to the plant breeder. In the damper and cool sections of the Vilayet of Wan he collected awned types with white grains and semi-awned, while in the continental and drier regions awned types well adapted to the climatic conditions predominated.

According to ORLOV each of the varieties of barley occupies a definite geographical territory and a polymorphic extension centre which are very clearly defined. The number of varieties in Asia and in Africa is almost equal. While, however, 38 of the 39 African varieties are concentrated in Abyssinia and in Eritrea, which clearly shows the existence here of a polymorphic centre, the Asiatic varieties are distributed over nine distinct geographical regions, twelve of them being found in Japan and nine in Syria. Among all the regions studied by the Russian Institute of Applied Botany, Abyssinia is the richest in barley types of which a great number are strictly local in character. This mass of material is of considerable value in selection work. Among them are to be noted particular types that are conspicuous for the size and strength of the straw, for their qualities of resistance to various cryptogamic diseases (this especially the case with the white type) for the high average weight per 1,000 grains, for low protein content and high tillering capacity.

KOULESHOV has interested himself in the different types of maize. He distinguished eight groups, among which the *amylacea* group has its centre of polymorphism in Peru and in Bolivia, while the *indurata* group is common in Central America, *indentata* in South Mexico and *everta* in the States of Iowa, Nebraska and New Mexico. It is difficult strictly to define the habitat of the other groups. It

would appear that the most ancient types of cultivated maize are derived from the *amylacea* group.

The work carried out by JOUZEPCZOUK and BOUKASOV on the material that they collected during their special expedition to Central and South America appears to be full of promise for the breeders of potato-plants. This work makes it necessary completely to modify present theories regarding the origin of the potato as now cultivated. According to the principles of VAVILOF there are two centres of origin, of which the most important is the high table land of Peru and Bolivia and the other, which is of considerably less account, the south of Chile. In the district of Cuzco alone, 150 different varieties of potatoes have been discovered which form a very complex group botanically. The botanical examination of the South American varieties goes far to substantiate the view that the potato is of hybrid origin. Hence the species *Solanum tuberosum* should be regarded as of a composite order, which should be split up into a number of simple species, possibly deriving from as many wild species. Thus it seems to be certain that the centres of polymorphism for the potato are in a position to provide the plant-breeder with a large variety of hereditary qualities, likely to have very considerable practical value for improvement by crossing.

The attention of plant-breeders should also be drawn to VAVILOF's law known as "the law of homologous lines" in accordance with which the variations which are shown in the different subdivisions of a single botanical unit always take place in a parallel sense so that the modifications in characteristics are everywhere repeated with remarkable regularity.

For example, the existence of types of non-ligulate soft wheat suggests the existence of similar forms in hard and dwarf wheats and also, by analogy, in rye. As a matter of fact, such types of hard wheat are to be found in Cyprus, and of dwarf wheat and rye in the Pamir. F. KOERNICKE described some time ago types of barley with smooth awns and recently it has been found possible to reproduce these artificially by crossing with types having normal awns. Quite recently varieties of wheat with smooth awns have been discovered, the existence of which might have been presupposed on the principle of homologous series. Hence it will undoubtedly be possible to breed for purposes of cultivation strains of smooth-awned wheat which will have a practical value similar to that of the corresponding barley strains.

While VAVILOF's law suggests for plant-breeders certain limits that nature itself does not allow them to transcend, it also indicates certain new possibilities for their work and in this way they can be saved from useless effort and led to devote their attention to work of a more profitable order.

Plant-breeders can also with advantage devote attention to genetic cytology and the experimental production of types, which are both closely studied at the Leningrad Institute of Applied Botany. MEISTER and SAFËHN have shown that it frequently happens that types of considerable practical value are the results of a crossing between two species differing as regards the number of chromosomes. For example, a hybrid, rye \times wheat, with 46 chromosomes, has been successfully produced which is duly fertile and true to type and may be regarded, so to speak, as a quite new species of cereal.

In this connection attention should be paid to the special importance to be given to the increase or reduction in the number of chromosomes; in practice it will be found that any variation in this number is accompanied by corresponding modifications in the morphology, anatomy and physiology of the plants. Observation shows that, parallel with a doubling in the number of chromosomes there will

be an increase in the dimensions of the cells of the epidermis, of the vascular system, of the pollen grains, etc. Similarly, a doubling of the chromosomes may exercise either a positive or a negative influence on fertility. Since it is possible to produce such doubling by a number of artificial means, modern genetics is, up to a certain point, capable of producing at will tetraploidal types, and such types have already been used in practical work. In this way the problem of artificial production of new types has been successfully handled, a problem which students of genetics have for a long time tried to solve by attempting to bring about mutations by artificial means.

By utilising selection and crossing, practically all that is possible has now been done for the old types in countries where cultivation is of an intensive character. If therefore it is desired to make any further progress in the improvement of crop plants, new means and methods will have to be employed. The Russian work which has been here described certainly marks a stage in advance and it is to be hoped that, before long, these particular scientific studies will prove of direct benefit in practical work.

Dr. VON GESCHER.

TROPICAL AND SUBTROPICAL AGRICULTURE

Grafting of Rubber Trees.

GENERAL.

For several years past the improvement of rubber trees by means of grafting has been a subject of study. The best methods are being investigated by the experiment stations and grafting may be said to be increasingly used and has gained great popularity with the planters, as it enables them to obtain results more quickly than by seed selection. Rubber grafting originated with and was practised fifteen years ago for the first time by Dr. CRAMER and M. van HELTEN, in the Dutch Indies (Java and Sumatra). In 1923, Dr. HEUSSER, of the Experiment Station of the A.V.R.O.S. in Sumatra published the results obtained from the first tappings of grafted rubber trees. From there the practice spread to Malaya, and thence to Indo-China where from 1918 M. STIBBE established large nursery gardens of multiplication and introduced clones from Java, Sumatra and other rubber producing countries. These nurseries will within a short time be able to supply grafting wood in abundance.

From 1923, the results of tappings made on certain rubber clones were such that there was no further hesitation about forming plantations composed of the best grafted clones and of plants springing from seeds from the best mother trees. However a sufficient number of tappings had still not been effected to justify the establishment, on a commercial scale, of plantations entirely composed of grafted rubbers. Now all is changed, the encouraging results obtained in 1923 have been confirmed by six more years of experiment and it is no longer necessary to plant by way of precaution selected but not grafted trees. Experience has shown that the production of these selected non-grafted trees is poorer and more variable than that of the rubber trees grafted and coming from good clones.

The mixed plantation in addition presents the disadvantage of complicating the work of tapping, as the bark of grafted trees is not at the same stage of development as that of trees not grafted, and it is in consequence very difficult to carry out a good tapping on all the rubber at once. Recent plantation work has further shown that grafted rubber plants coming from different clones behave quite differently when they are tapped in accordance with a uniform system, and consequently such

a practice is rendered impossible. Better results will ensue from planting together only such clones as closely resemble each other in yield capacity, or from planting all the trees coming from a single clone on the same plot. At the present time, planters tend to mix new clones from which much is expected with older and valuable clones.

DISTINCTIVE CHARACTERISTICS OF THE GRAFTED PLANTS.

A number of differences exist between grafted plants and plants grown from seeds. Grafted plants give trees which branch much sooner and more abundantly than trees coming from seeds. In addition the conical character of the trunk is more marked in the latter than in the former, as is shown by the figures in Table I.

TABLE I. — *Average circumference in centimetres.*

	one metre above the ground —	20 centimetres from the ground —
Grafted plants six years old.	41.0	49.0
Plants from seed six and a half years old .	56.8	74.1

The bark of grafted trees is not so suitable for tapping as that of plants raised from seed and it is renewed afterwards with more difficulty. This is one of the objections most commonly brought up against the practice of grafting. In view of the importance of the question, numerous experiments have been undertaken to resolve the problem. Unfortunately it is difficult to discover what are the grounds for the fears expressed. HEUSSER is one of the few writers who has made any pronouncement on the subject and he wrote thus in one of his early articles on the tapping of grafted rubber trees. "So far as I can judge from my observations, may renewal of the bark leaves nothing to be desired; possibly in the future it may be less satisfactory than with trees produced from seed, and the grafted trees may require more time for forming their bark than the trees from seed". On the whole HEUSSER is of opinion that with the grafted trees, the fresh growth of bark is a little less rapid than in vigorous plants coming from seed and tapped for the first time. Another writer states that in Java results have been obtained with grafted plants at Bodjong Datar which are slightly superior to those of seed produced trees of the same age. Normally the bark of grafted and of non-grafted trees vary very much in cork content. Cork which is formed solely of dead cells can have no direct action on yield, but its presence or absence may influence up to a certain point the effect of the tappings. In order to obtain precise data on the thickness of the bark, the rapidity and facility with which it is renewed in the case of grafted rubber trees, certain measurements have been taken on the Pilmoor plantation. The results appear in Table II.

The figures indicated for the percentage of bark renewal are very high. These experiments seem to show that the virgin or renewed bark of the young grafted rubber trees of the four clones, on which measurements have been taken, is perfectly suitable for tapping and that its renewal is effected in the most satisfactory manner possible.

Nearly all the rubber clones display a peculiarity known as "elephant's foot". This phenomenon is caused in part by the quicker growth of the graft at the level

of the join, and on the other hand, by the fact that the grafted plant grows more rapidly than the plant from ordinary seed, at the same level.

In addition grafted trees show less divergence than do those from seed between the product of a low tapping and that of another tapping made at a certain height.

All the trees of the same clone lose their leaves at the same time, and present the same characteristics of leaves, trunk, branching, etc., with the result that a plantation consisting of the same clone grafted will present a much more homogeneous appearance than any other type of plantation.

TABLE II. — *Thickness of bark in millimetres.*

Clone	Date of the measurements	Upper panel	Date of the tappings								Lower panel
			1st Dec.	1st Apr.	1st Jun.	20 July	1st Aug.	1st Oct.	1st Dec.		
A 44	July 1928	5.8	4.4	3.9	3.1	1.2	—	—	—	5.5	
	January 1929	6.9	5.5	5.2	4.7	—	4.3	4.1	3.5	6.5	
B 50	July 1928	5.1	4.2	3.7	2.8	1.1	—	—	—	4.7	
	January 1929	5.8	5.0	4.6	4.2	—	4.1	3.9	3.2	5.8	
B 58	July 1928	5.7	4.5	4.1	3.2	1.0	—	—	—	5.5	
	January 1929	6.1	5.0	4.7	4.6	—	4.4	4.2	3.2	6.2	
B 84	July 1928	7.0	5.2	4.7	3.8	1.3	—	—	—	6.7	
	January 1929	7.7	6.3	5.9	5.5	—	5.1	5.2	4.0	7.5	
Average for the above.	July 1928	6.6	4.6	4.1	3.2	1.2	—	—	—	5.6	
	January 1929	6.7	5.5	5.1	4.8	—	4.5	4.3	3.5	6.5	
Increase		0.7	0.9	1.0	1.6	3.3	—	—	—	0.9	
Percentage of renewal.	July 1928	—	77	99	54	—	—	—	—	—	
	January 1929	—	82	77	71	67	—	65	52	—	

GRAFTING

The operation of grafting is very complicated, and in order to obtain good results many precautions must be taken. Grafting may be done in the nursery or directly on the trees when finally in place. Both methods have their upholders and the first is generally followed in Sumatra, the second more especially in Malay. The decision whether to graft in the nursery or on trees in the plantation is made subject to special conditions for each case, *e.g.*, date of grafting, extent of the plantation to be grafted, etc. It may be said that as a rule grafting on trees in the plantation has the drawback that supervision of the coolies engaged is more troublesome. On the other hand the advantage of this method is that it does not involve any interference with the root system of the young plants, and to this the majority of planters attach great importance.

Grafting in the nursery can be more carefully supervised, and it is also possible to counteract the effects of any unfavourable weather conditions. As the nurseries are established as near as possible to the place of final plantation, the risks and cost of transport of the grafted plants are reduced to the strict minimum.

CHOICE OF STOCKS AND OF SCIONS

Every effort must be made to obtain young stocks of the same growing strength. The best age varies from 10 to 13 months, but it is wise to take account rather of

appearance than of age. The diameter at 10 cm. from the ground should be about more 2.5 cm. If the grafting is done in the nursery, the stocks grafted should not be more than 13 months old, as later the risks of transplantation become too great. Certain precautions should be taken to obtain a rapid succession of the stocks suited for grafting in the nursery. The site selected should be a sheltered place generally at the bottom of a valley; the rows of young plants should run at right angles to the line of greatest slope of the land. All lateral buds that might interfere with the rapid growth of the stock must be pinched off. The growth of weeds must be checked; there must be no employment of cover crops and a fine mulch should be maintained by means of repeated gentle raking. The use of fertilisers, such as farm manure, nitrate of soda or complete fertiliser is recommended. The question may also be asked whether there would be any advantage in taking as a stock a plant coming from selected seed. This point does not seem very important and it is sufficient to make sure of the homogeneity of the stocks as a whole. Stumps may be taken as stocks with a good percentage of results. Very careful experiments on the grafting of stumps have been made in the Experimental Garden of Tjiomas in Java.

The choice of scions is also important; branches may simply be taken from a tree which is known to yield well. The choice is not easy, as suitable branches, the diameter of which is nearest to that of the stocks selected, are often to be found only at the top of a tree and are in consequence difficult of access. This difficulty can be remedied by stimulating, by heavy pruning, the rapid growth of twigs on the large branches at the base of the tree. It is however not possible to obtain scions in sufficient quantity and it has proved necessary to establish multiplication nurseries for obtaining scions. Considerations as to site and the attention to be given to these nurseries follow the same lines as for nurseries for stocks.

CHOICE OF BUDS TO USE FOR THE GRAFT.

Up to the present no great attention has been paid to the choice of eyes or buds for budding; the great majority of failures due to some cause which seems mysterious — all the usual precautions having been taken — may be explained by a bad choice of eyes. Too much care can hardly be given to the choice, and the Chinese coolies engaged are usually able to find suitable eyes.

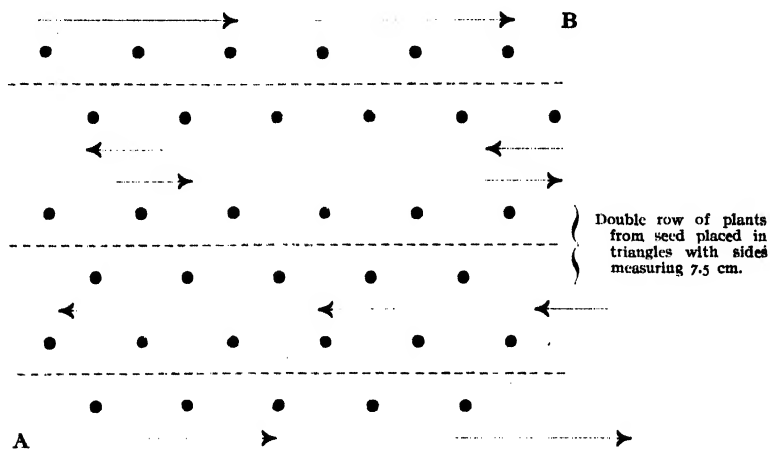
METHOD OF GRAFTING.

The graft employed is the shield graft, and is carried out as near the ground as possible. A small tongue of bark is cut from the stock but left attached by its base. This tongue is pressed back and the shield graft is introduced; the shield or patch should fit the panel thus exposed, and the cut should have been made down to the wood. The same precautions should be taken for the introduction and preparation of the shield graft as for an ordinary graft; it should be noted merely that the bark tongue is not detached from the stock but is replaced over the graft after the latter is in place. It is impossible to give a strict rule for the period at which it is best to perform the grafting. The essential point is the possibility of detaching the bark easily without risk of damaging the underlying layers.

GRAFTING OR BUDDING IN THE NURSERY.

When budding is carried out on plants in the nursery, it is wise to take certain precautions in the establishment of the nursery. Care should be taken to adopt a standard width for the beds so as to facilitate the work of labelling and of the ne-

cessary supervision ; sufficient space should be left for the plants to attain their maximum development ; the method of plantation shown in the accompanying diagram has given very good results.



It is so arranged that each bed contains a fixed number of seedlings, for example, a bed arranged as above, 1.8 m. wide by 36 m. long, will contain 1000 plants.

The coolies have room to move about between the rows and can work without any risk of injuring the plants. They begin work at point A and follow the arrows finishing at B.

STUMPING AND TRANSPORT OF THE STOCKS BUDDED FOR TRANSPLANTATION.

A young stock which has been budded will not as a rule be cut or stumped till at least 1.2 m. of lignified wood has been formed over the graft. Some days before cutting a systematic removal of leaves should be carried out ; so as to ensure the good recovery of the stock, the cut will be made below at least three dormant eyes or buds. A suitable length for the budwood stick is about one metre ; the sticks should be as soon as possible packed for transport. The budwood sticks should be so wrapped as not to touch each other ; the packing material employed should be inert matter which is not hygroscopic in character ; coconut fibre, sterilised sand or wood charcoal reduced to a fine powder may be used.

REGRAFTING OF STOCKS.

In cases of failure regrafting may be performed either in the nursery or on the field, and is usually effected near the original graft so as to obtain a graft as near the soil as possible. Generally speaking the grafting cannot be repeated more than twice without destroying the stock.

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J. LECROS

Notes.

SHADE TREES FOR COFFEE BUSHES AT PORTO RICO. — An ideal shade tree for coffee bushes should meet the following requirements: it should have a root system penetrating deeply into the soil in such a way as not to interfere with the roots of the coffeebush; it should not be a host plant for parasites or diseases that may be harmful to the coffee bush; it should be resistant to strong winds; the cover should not be too thick; it should be of rapid growth and at the same time reach a considerable age; it should be suitable to the soil and climate of the region in which it grows. Leguminous plants seem to be the most suitable for the purpose.

At Porto-Rico four kinds of shade trees which more or less fulfil the above conditions are in very general use. They are as follows:—

1. "Guava" (*Inga vera*). — This tree is of rapid growth and readily adaptable to varying conditions; its leaves cover a wide space so that not many are required per hectare. Unfortunately however, it is liable to attack by a number of diseases.
2. "Guama" (*Inga laurina*). — This tree is mainly used in the neighbourhood of the coast but it is liable to infestation by ants.
3. "Moca". (*Andira inermis*). — This tree is of less rapid growth than the two previously mentioned and hence is of less value; on the other hand it is very resistant to wind and is never attacked by parasites. It loses its leaves every year and thus remains leafless for a certain period.
4. "Bucare" (*Erythrina* sp.). — Many *Erythrina* species are used as shade plants. They give a perfect cover and as they are of the leguminous order the leaves, when they fall, add richness to the soil. Unfortunately they are not particularly resistant to wind damage.

INFLUENCE OF PRUNING ON THE GROWTH OF TEA-PLANTS. — Recent trials made in British India have shown the influence of the omission of pruning for a year on the growth of young tea-plants.

With the older plants there is to be noted a diminution in the tendency of the healing of the deeper pruning cuts in wood which is more than two years old and a loss of balance between the root and leaf systems during the dry season, and thus the value of unpruned plants tends to be impaired. These disadvantages are considerably diminished in the case of quite young plants which cannot be pruned in

the year following the tapping process, budding strength and extension being in this way increased. If the tea-plants are left unpruned the root-growth is encouraged, the balance between roots and leaves restored and the general strength of the plant augmented. Pruning tends to diminish the final height of the tea-plant and during the early years it may be regarded as quite satisfactory, if only a strong and adequate woody growth is made.

COMPOSITION OF COFFEE ROBUSTA. — The results shown in notices on the coffee bush in Java indicate that *arabica* and *liberica* coffee have a caffeine content varying from 1 to 1.5 %, while the rate of caffeine in *robusta* coffee is always higher. Experiments have been made at Malang (Java) on 80 samples of commercial coffee which have given the following results : the caffeine content in 80 samples coming from plantations producing *robusta* coffee appeared to vary from 2 to 2.6 % (average 2.29 %), with in one exceptional case of 1.97 %. The amount of water soluble matter varies from 24.2 to 31.6 % (average 28.3 %) and the ash content from 3 to 4.2 % (average 3.6 %). It was not possible to establish the fact of any clear relation between the composition and the conditions under which the bushes were grown.

POLYEMBRYONISM AND POLYSPERMIA IN COFFEE PODS. — Apart from the pods containing one seed only, others are to be found which contain upwards of two seeds, the normal number. Such pods are known as polyspermous if they have only one endosperm and polyembryonic if they have two or more endosperms in each case. Some of the endosperms of these seeds were sown separately and thus normal plants were obtained which were examined for the purpose of studying the first stages of polyembryonism, to ascertain whether this characteristic is hereditary. Many authorities are of opinion that coffee bushes with polyspermous pods are frequently characterized by irregularities in flowering and in growth forms ; in the two cases these irregularities are distinguished by an increase in the number of certain parts or sometimes by their fasciation. Polyspermous pods of *robusta* coffee have also been found at this Station and the maximum number of seeds in a single pod was as high as fifteen. It seems probable that there is a relation between polyspermism and fasciation, or the generally luxuriant character of the growth.

A FODDER PLANT SUITABLE FOR SEMI-ARID AREAS (*Vicia atropurpurea*). — In South Africa very good results have been obtained by cultivating " Persian Vetch " (*Vicia atropurpurea*). This vetch has been sown in districts of which the altitude varies from 1000 to 2000 metres and where there is a rainfall of 635-1143 mm. during the summer : the soil is sandy and of poor quality and a light dressing of phosphatic fertilizer was given. The results show that this vetch can be grown equally well in winter as in summer and that it is easily convertible into hay and that, in association with maize, it provides a good form of ensilage.

SUGAR-CANE VARIETIES FOR DISTRICTS LIABLE TO INUNDATION. — At the time of the cyclone at Miami (Florida) the Coimbatore, especially Co. 281, showed a remarkable powers of resistance to the results of flooding, which lasted for over three months. When the waters subsided, all the shoots that were without physical defects were large and healthy, and the germination of the shoots below ground was normal.

INDIA AT THE SAMPLE FAIR AT MILAN. — The High Commissioner, who in previous years had been impressed by the value and usefulness of the Milan Sample Fairs, is giving his complete support to the XIIth Fair, which will take place from the 12th to the 27th April 1931, so that India will be officially represented on the occasion and will provide in its own special pavilion an exhibit of many varieties of its characteristic plants, thus supplying a fresh proof of the interest which these fairs arouse outside Italy.

M. B. S.

AGRICULTURAL ENGINEERING

Notes.

Trials and Experiments.

FARM ENGINEERING, TRIALS AND EXPERIMENTS IN THE UNITED STATES. — Forty Experimental Stations carried out during 1929, 317 special trials and experiments. The most important of these were machinery trials conducted in 33 stations for the purpose of solving 132 different problems and next in order were the following: farm buildings, 41 problems — irrigation, 33 p. — drainage, 24 p. — use of electricity, 32 p. — raw materials, 21 p. — rural hygiene (water purification, etc.), 13 p. — soil improvement, 21 p. — The trials and experiments were about the same number as in 1928 but they were carried out on more methodical and co-operative lines.

Electricity.

USE OF ELECTRICITY IN OHIO FARMS (U. S. A.). — Experimental work on the subject of the use of electric power was carried out by the Ohio State University in 1926 on 13 farms in this State, which was continued until 1930.

It was ascertained in the first place that, for light and small motors, the monthly consumption of electric power was 38.8 KW-hours. In order to study the details of this consumption, use was made of electricity machines and instruments proportionate to the size of the various farms and the consumption of energy was calculated for each machine. It was thus possible to prove that for a family of from 5 to 7 persons, the use of electricity for cooking involved a consumption of 30-35 KW-hours per head monthly, while a refrigerator required 40-KW hours annually. An ordinary electric iron required 5 KW-h. per month and an ironing machine 10-15 KW-h. A pneumatic cleaner used from 5-6 hours consumed 1 KW-h.

In addition, all the machines used on the farm were worked by electricity for purposes of the test, including water-pumps, milking machines, crushers, chaff cutters, etc. The use of a milking-machine worked by electricity reduced the time required for milking by one-half and the machine consumed about 2 KW-h. per cow and per month, and 2.26 KW-h. per 1000 litres of milk. Fine crushing of 50 kg. of oats required 2 KW-h., while for the rough crushing of maize 0.1 KW-h. was sufficient for 50 kg.

A 5-h.p. motor was used for cutting fodder plants for ensiling; for this work and for stacking the fodder, cut in 6 mm. strips, to a height of 13 m. using a pneumatic carrier, 1 KW-h was used per ton.

The principal difficulty of electrification lies in the fact that the current prices are relatively high since the farms are not grouped in villages but scattered at considerable distances throughout the countryside.

Agricultural Machine Factories.

PRESENT POSITION OF THE BUILDING OF AGRICULTURAL MACHINE FACTORIES IN THE U. S. S. R. — On 15 June 1930 the Rostov-on-Don Factory was opened and it is reckoned that it will turn out each year 30,000 reapers and mowers for use with a tractor, 40,000 reapers and binders and 10,000 harrows. The cost of construction was 26.5 million roubles, of the mechanical plant 39 millions, for workmen's dwellings 11.5 millions, so that the total cost amounted to 77 million roubles.

The tractor factory of Stalingrad-on-Volga started work on 17 June 1930 and is intended to produce 50,000 (IHC 15-30 type) machines. For the first year the outturn will be limited to 30,000 machines and a complete outturn is not expected till the second year (1931-32).

The reaper-threshing machines factory at Saratof is expected to begin work in May 1931. The annual output is reckoned at 15,000 reaper-threshers, 10,000 plants for seed-screening of the "Petkus" type and 10 % of spare parts.

A factory is now being built at Novosibirsk in Siberia for turning out seed drills for mechanical and animal traction, mechanically or animal drawn reapers, etc.

At Karkof the first great tractor factory is now in process of construction and is intended to provide an annual outturn of 50,000 machines like the Stalingrad factory.

About 20,000 tractors should be produced annually by the Putilovsky Leningrad Factory.

Lastly, a large factory at Tcheljabinsk is being planned to turn out some 50,000 40 h.p. tractors every year.

Mechanisation in Agriculture.

USE OF AGRICULTURAL MACHINES IN THE TROPICS. — In an article relating to the use of machines in the cultivation and harvesting of tropical plants (*Der Tropenpflanzer*, Berlin 1930, No. 7) MARKUS shows that an extended use of machinery would go far to diminish production costs.

As regards *ploughing*, strong and heavy machines are necessary which are easy to drive, such as the Brabant plough. Tractors also should be used as far as possible but always with machines that are properly adapted to the power that is employed.

Preparation for sowing is of very special importance because of the rapid growth of weeds in tropical districts.

Cotton growing, which hitherto has required a very large amount of labour, would specially pay for mechanisation. Thus all thinning out and harvesting could be carried out by machinery. For the present the machines required are still at the experiment stage, but the cotton harvest problem is already beginning to show signs of solution, particularly from the point of view of the use of picking and transport plant.

In order to ensure economy in the use and maintenance of the various machines, the institution of co-operative societies is strongly advocated.

Use of Harvesting Machines in Ukraina. — During the spring of 1929 there were in this country of 27.4 million hectares, about 300,000 harvesting machines, of which 81.8 per cent were hand reapers, 16.9 % reaping machines, and 1.3 % reaper-binders. Taking the machines as a whole 25 % required improvements.

In 1930 Ukraina received 39,000 new harvesters, of which 25,000 were for hand-reaping, 13,000 mechanical reapers and 1,000 reaper-binders. By this means the requirements of the farming population for harvesting-machines was fairly met except as regards the reaper-binders which were only equivalent to some 30 % of the number necessary.

Hitherto the number of threshing-machines has been insufficient; in the spring of 1929 threshers amounted to 57,000, 6,000 of which were mechanically driven. In 1930 the total demand for machines of this type was covered as regards 43 %.

Milking Machines.

THE CLEANSING OF MILKING MACHINES. — The use of milking machines is constantly increasing in the United States, a fact which justifies the very full research work that has been carried out with regard to them, more particularly from the point of view of ascertaining whether they enhance or diminish the hygienic value of the milk.

In order to calculate this value, the number of bacteria is the test usually employed. This number should not exceed a maximum of 10,000 per cm³ for choice milk subject to medical inspection.

Trials made on thirteen farms have shown as many as 257,000 bacteria per cm³ where milking is done by a machine. At the same time samples of milk extracted by machines which have been previously sterilized in all sections by boiling water, to which powdered soap has been added, have been tested and in 261 samples the average number of bacteria per cm³ was 19,300.

Further tests made on 20 farms where the milking machines had been similarly sterilized showed an average number of 13,750 bacteria per cm³ for 622 samples and less than 10,000 for 376 samples.

Comparative tests have shown that sterilization by boiling water, with soap powder added, gave in every case the best result, superior to those obtained by using chloride of lime or other chemical products. In order that milking machines may be properly cleaned it is essential that they should be taken to pieces on each occasion in order that each separate component may be treated separately. The rubber parts should also be regularly renewed after a certain period of use. These tests and experiments are fully described in the *U. S. Department of Agriculture Farmers' Bulletin* No. 1315, June 1930.

World Agricultural Census.

The World Agricultural Census organised under the auspices of the International Institute of Agriculture and carried out according to a uniform scheme, was completed in the various countries in 1929 and 1930.

As the results become available the Institute proposes to publish them under the form of separate bulletins for each country.

There are here given extracts from the census returns sent by Algeria and Estonia for agricultural machines and implements.

Agricultural Plant in Algeria. — The recent census made by the Administrative Authority of this Colony gives the following inventory of agricultural plant as used by European and native farmers. The list is incomplete, for it leaves out a whole series of machines, etc. used in vine-growing, including the presses and motor-pumps both for sulphate and for sulphur. It, however, gives a good idea of the importance of such plant in the country.

Agricultural machinery plant, etc. in Algeria in 1930.

Traction engines	1,524
Tractors	5,175
Steam ploughing tackles	146
Electric ploughing sets	2
Motor-ploughs	577
European ploughs	200,512
Native ploughs	344,061
Cultivators	14,835
Harrows	56,436
Disc-harrows	8,967
Rollers	10,257
Seed drills	4,891
Mowers	6,596
Binders	15,433
Harvester-thrashers	550
Thrashing machines	1,565
Carts and Waggon's	53,006

Agricultural Machinery and Implements in Estonia. — The following tables summarize the agricultural plant census of 1929. The first table shows the total number of agricultural machines and implements in Estonia calculated for 133,357 farms and 671 agricultural machinery co-operative societies, while the second table indicates the average distribution of certain important machines and implements per 100 farms and per 100 ha.

TABLE I. — *Total Number of agricultural machines and implements in Estonia in 1929.*

Motors	1,709
Portable engines	1,526
Tractors	644
Swing ploughs	119,430
Single share ploughs	134,872
Multiple share ploughs	15,349
Cultivators	6,878
Harrows	268,077
Pulverisers (?) (Ruadrullid)	3,233
Rollers (?) (Randallid)	2,220
Sowers	5,799
Manure spreaders	296
Mowers	20,951

Horse-drawn rakes	20,629
Harvesters	9,810
Potato lifters	913
Thrashers	9,946
Winnowing machines	17,324
Graders	2,340
Flax crushers	27,210
Chaff cutters	7,369
Cake-breakers and root cutters	314
Peat-crushers	1,291
Farm carts	202,489
Carriages	31,641
Motor-camions	139
Motor-cars	173
Sleighs for goods	180,154
Sleighs for persons	46,730

TABLE II — *Average Distribution of Agricultural Machines and Implements in Estonia per 100 farms and 100 ha. according to the seven size groups of farms.*

Size of Farms in hectares	Number of Farms	Ploughs		Harrows and cultivators		Seed drills		Mowers		Horse Rakes		Grain Harvesters		Thrashers		Winnowing machines and graders	
		per 100 farms	per 100 ha	per 100 farms	per 100 ha	per 100 farms	per 100 ha	per 100 farms	per 100 ha	per 100 farms	per 100 ha	per 100 farms	per 100 ha	per 100 farms	per 100 ha	per 100 farms	per 100 ha
1- 5	21,456	86	64.9	69	52.5	0.1	0.09	0.4	0.19	0.5	0.19	0.3	0.19	0.4	0.27	0.8	0.61
5- 10	21,000	153	47.9	133	41.0	0.2	0.06	1.2	0.21	1.0	0.21	0.3	0.10	1.1	0.33	3.2	1.05
10- 20	34,977	201	32.4	198	31.9	1.5	0.26	7.8	0.70	7.2	0.70	2.6	0.41	3.9	0.62	8.7	1.40
20- 30	24,235	238	24.4	261	26.8	5.6	0.54	23.0	1.29	21.5	1.29	8.3	0.89	7.2	0.95	17.7	1.82
30- 50	22,185	277	20.8	310	23.3	9.0	0.72	37.2	1.39	38.2	1.39	18.9	1.42	17.3	1.30	32.9	2.47
50-100	6,433	347	17.9	400	20.7	20.5	1.06	52.0	1.27	53.3	1.27	32.3	1.67	20.8	1.07	44.7	2.31
above 100	471	977	13.0	1,102	14.4	152.2	1.98	142.5	1.05	139.7	1.05	100.4	1.31	62.2	0.81	126.8	1.65
Averages for the 133,357 farms		202	26.7	208	27.5	4.5	0.60	15.7	1.09	15.4	1.09	7/3	0.97	7.0	0.93	14.3	1.89

H. J. H.

AGRICULTURAL INDUSTRIES

Animal and Vegetable Casein: Preparation and Uses.

The systematic utilisation of the by-products of the agricultural industries has acquired capital importance, alike from the point of view of the progress of nations as from that of the contribution made by the value, frequently very high, of these by-products to the solution of the general economic crisis through which agriculture is passing. Among such products a study may here be made of animal casein, vegetable casein, and their derivatives. The most recent data on the development of this very important industry will be given, taking into account in particular recent applications of casein in agriculture and in nutrition. In subsequent articles, the manufacture and most recent uses of other important by-products of the dairying industry will be treated, including lactose, lacto-albumen, etc.

I. ANIMAL CASEIN.

Animal casein, a proteic substance belonging to the albumen group, is found in the milk of mammals in the form of colloidal suspension or solution, probably as a labile compound with calcium phosphate. It is obtained by coagulation of milk by means of acids or of rennet, and it forms the essential part of cheese. The casein content of the different mammals varies from about 3 % for cows' milk, 4 % for goats' milk, and 6 % for sheep's milk. A protein of the same type as the casein of milk is found also in the seeds of plants.

In industry, casein is extracted from well skimmed cows' milk by various processes : 1. *by precipitation with the help of acids* ; sulphuric acid is usually employed ($\frac{1}{4}$ litre acid at 66° Bé per 100 litres of milk) or hydrochloric acid (3 litres of commercial acid per 100 litres of milk) as well as other acids : acetic, lactic, phosphoric ; 2. *by coagulation with rennet*, the skimmed milk being heated to 37° about after having added the rennet : 3. *by auto-acidification*, allowing the milk to go sour in large uncovered vessels.

According to the method of precipitation employed for the separation of the casein, rennet casein and acid casein are distinguished ; the first may be again divided into *rennet casein* and *casein for food purposes* ; this latter is obtained by adding a determined quantity of bicarbonate of soda to rennet casein which has not been worked (curds) and it is soluble in water. Acid casein may be divided into casein precipitated by lactic acid or "lactic casein", obtained by spontaneous souring, and "commercial acid casein", obtained by addition of artificial acids, *e. g.* sulphuric, hydrochloric, acetic or other acids.

In the West of France, considerable quantities of made in particular of rennet casein and lactic casein, while the food casein is prepared in small quantities, and casein precipitated by mineral or organic acid is very rarely manufactured.

The Casein Associations at Surgères produce about 3,981,945 kg. thus divided :

Rennet casein	Lactic casein	Nutritive casein (?)
2,707,880 kg.	1,189,678 kg.	84,387 kg.

1. *Rennet casein.* — This is made manufactured in the following way : a casein vat containing from 2500 to 3000 litres is filled with skimmed milk ; the stirring-apparatus which makes 130 turns a minute is put into action, the steam tap is opened and the milk warmed to about 35°C., and the rennet is added. Liquid rennet is used almost exclusively at the concentration of 1 : 10,000, and enough is added as is required to bring about coagulation in 20 minutes, taking into account the degree of acidity of the milk. If it is desired to increase the yield in casein, from 2 to 3 % of calcium chloride may be added, freed first from any impurities and dissolved in warm water : one g. of dry calcium chloride is required per litre of skimmed milk. As its addition increases the action of the rennet, the quantity of rennet employed must be reduced in the right proportions.

After the rennet and, if employed, also the calcium chloride are thoroughly mixed with the milk, the stirrers are stopped at the end of two minutes, and coagulation is awaited, which takes place in from 20 to 25 minutes at most. The pace of coagulation can easily be controlled (which is especially necessary when several vessels have to be watched at the same time), by opening the escape pipes, so that the skimmed milk runs off ; when coagulation has come about, the milk ceases to run off. The fact of coagulation can be ascertained by dipping the finger vert-

ically into the mass and drawing it out crooked ; the hole thus formed makes it possible to judge if the working of the curds should be begun.

After the coagulation, the stirrers are set going again to break the curd, then cooking begins by gradual heating of the contents of the vat up to 60 to 63°C. The increase of the temperature from 30° to 60° should be carried out within half an hour, at the rate of a degree per minute. After the curd has been sufficiently warmed and divided, the clots should be about the size of lucerne seeds and should have a granulated consistency, the steam pipes are plugged and the stirring apparatus stopped, and the whey is drawn off, after placing a bag or a strainer over the opening of the waste pipe, so as to avoid all waste of casein.

Then the most important part of the work begins : the washing of the casein. This is the operation on which the quality, and more especially the colour and the degree of acidity of the casein depends essentially. In the first place soluble foreign substances and particularly lactose must be removed from the casein. Warm water (25 to 30°C) is used for the first washing ; then the stirring apparatus is put in motion (130 turns to the minute), washing is carried on for half an hour in this way, then the stirring is stopped, the water is passed through a strainer and replaced by cold water, and washing is continued and the process is begun over again under the same conditions.

When the washing water has been removed finally, the casein is pressed. This operation requires much care to ensure that the casein manufacture shall be profitable economically ; the more effective the pressure, the less steam is used and consequently less coal for drying the casein.

There are two kinds of presses : a fixed press and a press revolving on a belt. It is better to use the latter, especially in large industries as it involves a great saving of time and work. A wooden shovel is used and the casein is placed in bags lined with linen and these are left under pressure for from 12 to 15 hours, *i. e.*, till the following day. During that time measures have to be taken to ensure the proper working of the press screw and weights, so as to squeeze out all possible water as this will affect the expenses of drying. On the other hand the quality of the dried casein depends also, up to a certain point, on the pressing, as it only with a well pressed curd that the latter work will go through without hindrance. With a good and sufficient pressure, the casein ready for drying contains 30 to 55 % of moisture.

If it contains more, this may be prejudicial to the subsequent grinding apart from the additional cost of drying. It is only by satisfactory grinding that a uniform division and in particular a lightness of the casein mass can be obtained. When the casein contains too much water, the curd is caked and not in uniform pieces which renders it difficult to work and to dry.

Cleanliness of the press and the press bags have a great influence on the final product, which is seriously damaged by any want of cleanliness. If there still remains too much whey, and in consequence too much lactose in the casein, the lactic fermentation transforms this lactose into lactic acid which produces a too strong acidity, the result being the occurrence of a brownish coloration during the drying of the casein. In addition any want of cleanliness of the press or press bags may lead to the development of moulds in the residues, which decompose the albumens and penetrating into the casein may decompose it also and injure its hardness and its colour.

For grinding up the casein mass, different types of mills are employed, "Astra", the "Unic" centrifugal curd-breaker, etc. The first is simple in working and gives good results. Below the wooden funnel there is an arrangement of rotating knives of a special form which divide the casein mass uniformly. This can be taken to

pieces and cleaned easily. It is worked by hand or otherwise. The "Unic" mill is more complicated and consequently more expensive but it gives good results; it can however only be employed for casein well pressed.

Several types of continuous automatic dessiccators are on the market for drying casein, but although numerous new improvements have been introduced, the old models are still employed. The earliest system, producing casein of the first quality (extra white) is that of a dessiccator in the form of a cupboard or similar design; but this has the advantage of losing a good deal of heat with too great a consumption of fuel.

An improved type is the tunnel dessiccator which does not consume any excessive quantity of fuel and is therefore not costly to keep going. There are several types and the advantages in comparison with some of the more recent models are as follows: 1. all kinds of casein can be worked, which is only partly the case with the newer equipment; 2. if the instructions are followed and the temperature is maintained between 50 and 55°C. while careful grinding of the casein is going on, and if good raw material is used, a product of first quality is obtained. On the other hand the disadvantages are: the large supply of labour necessary — relatively high consumption of fuel (nearly one kg. of fuel to one of dry casein) — the length of time occupied in the drying process.

Among the new automatic types of apparatus, the tunnel dessiccators of R. BILLIER must be mentioned, which have the advantages of the former systems without the inconveniences. There are four sizes, with an hourly minimum output of 30 kg. (measurements: 5 m. \times 0.6 m.) and a maximum output of 90 kg. (5 m. \times 1.8 m.).

Rennet casein requires more care and a more thorough drying than the other caseins. The drying must be uniform if a product of first quality is desired. The BILLIER dessiccator gives the most satisfactory results. The required temperature is 85 to 90°C. somewhat higher than that required by the earlier methods; according to Professor DORNIC, it should be possible to dry a casein of first quality at 100°C. for five hours without any loss of the white colour. All the pieces of casein remain for 35 to 45 minutes in the apparatus. A number of equipments can be supervised by a single workman, since there is nothing to do except check the temperature, the delivery of the moist casein, and the bagging. The consumption of fuel is the same for the different types: about 500 grammes per kg. of dried casein, while the consumption of power varies from 2 to 5 HP. There are also many other types of dessiccators, as for example, "Rival", "Simplex", "Spiros", "Kreisluft-Horden-Trockner", and "Turbo-Horden-Trockner", both the invention of HAAS, as well as the "Unterluft-Kasein-Schnell-Trockner", invented by SEYFFERT.

In order to prepare a perfect rennet casein the following rules must be observed: only sweet milk should be used, if possible free from noxious bacteria especially those decomposing albumen. If sour milk is used, there will be drawbacks as regards the colouring; during the drying a brown coloration appears which makes it possible to prepare only a casein which is not transparent and is in consequence of lower value. It is obvious that casein prepared with sour milk has a higher degree of acidity and that in addition a very acid milk cannot be completely skimmed. Too much fat remains in the skimmed milk which hinders the subsequent manipulations.

The presence of peptonising bacteria may provoke a partial decomposition so that when worked over later the product will prove inferior. It is easy to see that from the bacteriological point of view during the cold season the properties of the casein prepared will be superior to those of casein prepared in the hot season; the

milk, owing to the lower temperature, is less rich in bacteria and can be more satisfactorily worked.

It is essential to eliminate as far as possible the fats of the milk; a perceptible content in fat (more than 0.05 %) in the skim milk may produce a brown coloration during the drying of the casein and may make further manipulation useless. A good casein should not contain more than one to 1.5 %. The greatest cleanliness must be preserved in all tubes and especially in those through which sour milk passes. In France, tubes are employed; these are exceedingly difficult to take to pieces for cleaning, which is usually carried out by pumping in cold and then hot water and finally passing steam through. During the coagulation of the milk and the working of the curds, it is essential to preserve the temperature and timings prescribed. The main cause of the browning of the casein consists in insufficient washing; a matter of very great importance. The pressing of the casein should be carried to the maximum point so as to reduce the expenses of the drying and to avoid the danger of a further autoacidification. The press, the press-bags, as well as all cloths should be kept scrupulously clean. To divide the mass of pressed casein special types of grinding apparatus are employed so as to obtain a uniformity which will give a lightness to the product. The drying of the particles of casein must be uniform and the excessive temperatures that produce the browning of the casein must be avoided which will occur especially when it has not been prepared with the necessary care. The product obtained should be kept in a cool place.

To meet the requirements of trade and industry, a good rennet casein should have the following properties: low acidity, moisture not higher than 12 %, percentage of fat not higher than 1.5 %, a white colour, nearly transparent. One grain of casein well dried cracks under the teeth, while casein which is not properly dried is easily compressible.

The preparation of *casein for food purposes* is much the same as that of rennet casein: the mass of moist casein should be pressed rapidly and completely, and bicarbonate of soda should be added in the proportion of from 1.5 to 1.6 kg. per quintal of moist casein, the whole being thoroughly mixed. Drying is done under the same conditions as for the rennet casein. Food casein exists in trade in the form of meal. In Germany rennet is replaced by mineral acids (sulphuric, etc.) or organic acids, *e. g.*, acetic, or recourse is had to spontaneous souring of the milk.

Preparation of lactic casein. — The milk, carefully skimmed, is heated to 35 or 40°C and is allowed to go sour. In the cold season, with a view to accelerating the process, ferments employed in the ripening of cream are added; according to the season, the surrounding temperature and the degree of acidity of the milk, from 2 to 4% may be added. If these ferments are not available, skimmed milk is used or whey is obtained from the previous production. After 16 to 20 hours, the milk will appear thick enough to be worked further. The coagulum is first broken with a wooden spatula and a gentle stirring is employed, about 80 turns a minute instead of 130 used for the rennet casein. With rapid stirring too much pulverised casein would be obtained and would pass off with the whey with consequent loss. The rest of the process is the same as for the rennet casein.

In the preparation of acid casein, the yield is a little higher than that of rennet casein. As a rule from 27 to 28 grammes of rennet casein is obtained and about 30 grammes of acid casein per litre of skimmed milk. Naturally the yield in casein depends in the first instance on the nature of the milk employed.

Coagulation of casein with the help of mineral acids (sulphuric, hydrochloric, etc.). — The precipitation of casein with sulphuric acid is carried out at 50°C. in large vats made of hard wood treated with paraffin, adding acid at 66°Bé ($d = 1.82$)

diluted with six times its weight in water, so that the mass contains 0.3 % of the acid.

To coagulate with hydrochloric acid the milk must be warmed to 55°C, and the acid diluted ($d=1.41$) with six times its weight in water and then enough added to bring the content in HCl to 0.1 to 0.3%. The precipitate is washed several times, treated with a centrifugal separator, divided and dried.

Casein is also obtained by coagulation with ethylsulphuric acid or with sulphurous acid.

The dried casein is deprived of its fats by means of solvents such as carbon disulphide, petroleum ether, trielin, etc. After the extraction of the fats, the solvent is distilled so as to recover them, and a second extraction is made. The solvent must be distilled in a vacuum at 30 to 40° C. so as to avoid injuring the casein.

Casein may besides be purified by demineralisation, by dissolving it in alkalis and then precipitating it again by means of acids. The casein is dissolved in 13 times its weight of water containing from 1 to 2.5 % of sodium; when the solution is clear, precipitation is effected by means of hydrochloric acid.

The dessiccators used for casein precipitated by acids are not the same as those employed for rennet casein; among the most recent is the PASQUIER dessiccator.

The SZEKELY patent (Budapest, No. 126,423) for the preparation of casein is of interest; a container with very strong walls is used, this can be heated, is rotatory or is fitted with stirring apparatus and has a waste pipe, a man-hole and a pipe communicating with the supply of carbon dioxide. It is filled with milk warmed to about 100°C. and CO² is introduced under the pressure of 30 atmospheres. Then the container is rotated or the stirrers set in action; the pressure gauge indicates a slight excess pressure only, as the CO² remains absorbed by the milk precipitating the casein. After a thorough mixture is effected, a test is made by opening the waste pipe to see if the whey is clear or if it gives a precipitate with acetic acid; if this is the case, CO² must be again introduced, repeating the test till no further precipitate is obtained. Then the tap is opened so as to allow the CO² to escape, the man-hole is opened and the casein taken out. The whey is separated by filtration of the casein in suspension and the casein is washed, pressed and dried in the manner already described.

The advantage of this process is that a casein is obtained which is completely free from acids and also an entirely undecomposed and pure whey which may be directly employed for the preparation of lactose with a relatively high yield.

The C. BACHLER patent (Berne) relates to an excellent process for obtaining a casein which is perfectly white, pure, odourless, and free from fats, lactose and acids. The casein produced by this process is finely granulated and commands the highest prices on the market. It is produced on a large scale in many Swiss dairies with results that are economically favourable, and that combined with the simplicity and economy of preparation justify the place which this product holds on the market.

The procedure of this inventor is as follows: To milk heated to a certain temperature there is added either rennet, or acids, in such a way that coagulation is produced in 8 to 10 minutes, and stirring is done to obtain the small flakes. The temperature is then increased, the flakes unite and form grains; when a compact granulation is obtained, with the minimum of water content, and when the whey is completely clear, the contents of the container are quickly passed through linen filtering cloths so as to remove the whey. Then the casein is washed with cold water till it is completely white and cold. The operation lasts 30 to 40 minutes,

and it is possible to proceed at once to the treatment of another supply of milk. With two containers holding 1250 litres and with adequate heating surface it is possible in 10 hours, reckoning 50 minutes for each operation and including filling and emptying, to precipitate the casein contained in 30,000 litres of skim milk. The chilled casein is subsequently pressed in a hydraulic press. It is considered by the inventor that this method is preferable to the centrifugal. The cakes of pressed casein are pulverised in a special grinder and the grains, reduced to their original size are passed to a special machine which prevents agglomeration. Next they are dried on sieves covered with linen; forty of these sieves are placed on an a steel iron drying carrier which is moved about in a tunnel dessiccator. The drying temperature is from 55 to 60°C. and the drying of one load of the carrier takes from 2 to 3 hours, according to the outdoor temperature. After drying the carriers are taken out of the dessiccator and the casein removed. The larger grains are ground to the required size and the finely granulated casein is bagged.

II. — VEGETABLE CASEIN.

The names, "vegetable milk" and "vegetable casein" are given to the industrial products, extracted from soya beans, and resembling ordinary milk and casein.

The different varieties of this legume known as coming from the Far East and at present much cultivated in Europe and America, both for food and as green manure, are the yellow soya, the green soya and the black soya. The vegetative cycle of this plant is very rapid and the plant reaches maturity in three or four months.

The seeds are poor in starch but on the other hand rich in fats and proteic substances. The proportion of nitrogenous substances is as much as 38 %; that of fats is 18 %. The proteic substance contained in the seed is a globulin; *glycinine* or vegetable casein. OSBORNE and CLAPP have submitted this casein to acid hydrolysis, according to the method usually employed for determining the immediate composition of albuminoid substances; they found the following composition (reduced to 38 %).

Glutamic acid	19.5 %
Leucine	8.5 %
Arginine	5.1 %
Aspartic acid	3.9 %
Glycocoll	traces

Vegetable milk. — The milk extracted from soya beans is prepared in the following way by the Japanese chemist KARAMAJA: "The seeds are, in the first instance, very well washed and soaked in a bath of cold water during one whole day to soften them; they are then crushed and rubbed between granite grindstones, adding a quantity of cold water sufficient to obtain a fairly thick milky liquid; this liquid is then passed through a very fine cloth or webbing, so as to separate the milky emulsion or vegetable milk while retaining the residue formed by the seed integuments. This residue is rubbed again and washed once more to separate the

milk which is then added to that produced before. The pressed residue can be made into cattle cakes".

The vegetable milk, separated from the integuments and the parts of the seed which do not enter into the emulsion, has in every way the appearance of cows' milk; this milk is more or less thick and creamy and very frothy; its composition is as follows:

Water	92.50 %
Albuminoid substances	3.02 %
Fats	2.13 %
Sugars	1.88 %
Mineral substances	0.41 %
Cellulose residues	0.03 %

M. KARAJA adds to this liquid, which will vary considerably in its composition according to the quantity of water used and the degree of trituration, lactose and ordinary sugar, as well as small quantities of phosphate of potassium so as to prevent the coagulation of albuminoid substances at the moment of boiling.

The oil and the fats of the seed are in great part emulsionised in the liquid to the gain of the albuminoid or caseinoid substances (similar to legumin) the principal property of which is to encourage the emulsionising of the fats. If this vegetable milk is heated up to boiling point, an abundant frothing is obtained. In this emulsion, as in the milk of animals, the fats come to the top and spread over the surface of the liquid which is left to settle forming a very thick cream.

Vegetable milk, like animal milk, may be homogenised; this process breaks up to the utmost possible the oleaginous and butyaceous globules, prevents them from agglomerating into the form of cream, and the milk thereby becomes more delicate and of superior taste. It is besides possible to prepare in this way appreciated types of milk flour and condensed milk with a slight special taste, which may be corrected by adding a few drops of essence of hay.

According to KARAJA, the nutritive value of vegetable milk is noticeably similar to that of cow's milk; it contains considerable quantities of fats and of legumin, the chemical composition of this legumin much resembling that present in casein.

Industrial vegetable casein. — When soya seeds are subjected to treatment to obtain vegetable milk or vegetable cheese, all the oil contained in the seeds is usually left in these foods; this oil supplies, in addition to the casein producing element, as does the fat of ordinary milk or of cheese, also one of the necessary constituents of a complete food. In the preparation of industrial vegetable casein, the fats or oil must be eliminated in such a way as to render it fit for uses similar to those of ordinary industrial casein, which should not any longer contain the fat of milk.

So as to arrive at a complete utilisation of the extractive principles contained in these grains, each one of them must be utilised industrially to advantage; and a casein free from fats must be obtained. In these conditions treatment must yield: soya oil as pure as possible, casein freed from fats, and cattle cake.

The industrial treatment hence consists of:

- 1) an extraction of the oil by ordinary pressure ;
- 2) an extraction of casein precipitating it from milk prepared with the pressed pulps of the beans ;
- 3) the residual cakes mixed with forage and molasses form useful stock feeds.

1) *Cleaning and grading of seeds.* — The soya beans arrive at the factory in bags of from 60 to 70 kg. : the first operation is a careful screening to remove foreign substances, woody fibres, stalks, etc., as well as spoilt or withered beans and any lighter than water. The seeds are then placed in wooden buckets with mechanical stirrers ; these vessels should be by preference parallelepipedal, so that the material can be knocked up against the sides and thus undergo a more thorough cleansing. Plenty of water is poured in while the paddles of the stirrers are in action, so that in running off it takes with it the foreign bodies and dust. When the washing is finished, the operation is concluded by allowing the water to run off through a valve opening below which is covered with a fine metal sieve which lets the dust and sand through, while the mechanical stirrer goes on working till the water has all escaped. The buckets are then emptied and left to drain ; the washed beans are spread on metal sieves and left to dry slowly in the air.

Another method can be followed if the economic conditions of the district require it : since the mechanical stirring apparatus involves the consumption of a certain amount of motive power, the washing can be effected by means of small channels or sluices or in shallow buckets arranged ladderwise. The water runs from one bucket to the next, carrying with it the foreign substances, sand, etc. Other apparatus, such as the pointed boxes used for washing minerals, can be employed with advantage.

If for any special reasons, for example, to avoid chances of fermentation or with a view to the extraction of a purer oil, it is not desired to moisten the beans, they can be cleaned by making use of the ordinary equipment for dry cleaning, separators, ventilators, shakers, sieves, riddles, drums, etc. Where owing to the special conditions of the district water cannot be used in large quantities the beans may be dried by sifting or by ventilation. This latter operation is perhaps the easier and simpler, but it requires special screening and separating apparatus which is more costly. (The beans to be cleaned by means of hoppers are placed in the sifting and separating apparatus). Foreign substances which might injure the product are thus removed.

2) *Extraction of oil.* — The beans washed by one or other method are passed directly to a mill which crushes them and reduces them to powder. In this form they are passed on by a transporter for oil extraction. They are placed in woollen sacks with horsehair lining, or into press-bags, and then subjected to pressure ; the oil which is expressed is collected and forms the edible soya oil of first pressure. The inferior oil, known as second pressure oil, is obtained by crushing and reducing to powder the cakes left by the first operation. Lastly, the whole operation can be carried through once again, placing the soya meal between discs heated by steam to 50 or 60°C : in this way an oil of third quality is obtained, and the oil is almost completely extracted from the cake.

In order to extract the residual oil from the cakes, they can be treated in the usual way by solvents, *e. g.*, carbon tetrachloride or acetone, making use of extraction apparatus as usually employed in factories. After extraction, the solvent can be recovered by distillation and used again. The extracted oil remains as residue

in the still; the treated cakes, with the tetrachloride still in them, are pressed and gently warmed; the carbon tetrachloride is evaporated and is collected by condensation; the operation is concluded by exposure to the air, in a well aired chamber, where the last traces of the solvent are removed. The cakes are then ready for the extraction of casein.

3) *Extraction of casein.* — The dry cake resulting from the oil extraction, whether treated with carbon tetrachloride or not, is diluted in water and passed to the mill in the way already described; then a little water is added to form a soft and damp paste; water is again added till a frothy homogeneous mass of cream is obtained; during the operation cold water is added, little by little, in the proportion of 10 to 12 times the weight of the dry cakes, so as to obtain a milky liquid, which is poured into the kneading machines or rectangular wooden buckets, fitted with mechanical stirrers.

When the dough making operation is finished, the liquid is made to pass through filter-presses, fitted with cloth strainers of suitable mesh, and the filtered caseinous liquid is collected. The cakes are again diluted and washed with 20 times their weight in water in the kneading troughs or in buckets as before, and filtered a second time. The liquid collected is mixed with that which has been filtered in the first operation. The residual cakes are next dried or mixed with a forage and with molasses so as to make a molasses feed. Molasses coming from the manufacture of lactose, as well as the albuminoids contained in the whey of milk, may be mixed with these cakes, giving the feeds great nutritive value. The milky fluid obtained is then worked with a view to the extraction of casein. It is placed in cylindrical wooden buckets, fitted with mechanical stirrers and heating coils of tinned iron. Powdered plaster in the proportion of 500 g. to 1000 litres of milk is added, and the whole heated. Casein is precipitated in very bulky flakes which are collected by filtration and washed on linen. The casein flakes are then pressed and washed in fresh water and then filtered.

Refining of the casein. — The casein, ground as finely as possible is dissolved in a certain quantity of diluted soda, fairly weak, so as to give a slightly alkaline reaction. After this solution has been diluted in water, it is precipitated by means of acetic acid; the finely divided precipitate is filtered and washed on the filter, and submitted once more to a fresh dissolution in soda, then precipitated again by means of acetic acid. The deposit is washed, finely subdivided and passed to the filter-press. In this way a vegetable casein is obtained which is quite pure and white, and which is then dried in a vacuum at a low temperature so as to avoid any discoloration. The horny dried mass obtained after the drying is complete is finely pulverised. Vegetable casein is insoluble in water, but soluble in alkalis (soda and ammoniac) and may be employed, as ordinary animal casein, for the pasting of paper etc.

In the preceding operations only very small quantities of soda should be employed, for this alkali, if employed in large proportions, would decompose the casein and too large quantities of acetic acid would have to be employed in the different precipitations. In its turn the sodium acetate formed would retard the precipitation. The washing of the casein can only be effected by a very careful trituration. For precipitation sulphuric acid may also be employed, but it should be added in very small quantities.

When it is desired to obtain pure vegetable casein, not containing any fats, particularly in the case of cakes not submitted to the carbon tetrachloride treatment or not properly freed from fats, the casein, not dried, is purified by washings and

triturations in alcohol at 97° until a kind of fine emulsion is produced. This is next washed on the filter as quickly as possible with alcohol or ether. The fats are dissolved and the pressed product is finally triturated in a mortar till it is completely dry. The last traces of ether are eliminated *in vacuo*.

The Chinese and the people of Annam prepare vegetable casein at the present time in the form of dry and very friable sheets yellow in colour. This soya casein contains much fat (25 to 30 %) and in consequence there are certain products for which it cannot be employed, *e. g.* galalite. It must be completely defatted, if it is to be made fit for the different industrial uses to which animal casein is put. After the pulverisation, which is carried out in such a way as to reduce the casein to impalpable powder, and after sifting, the fats are removed by means of a solvent, carbon disulfide, benzine, petroleum ether, ordinary ether or carbon tetrachloride, etc.

Fats and resinous substances, as well as the soluble salts contained in casein, may be also removed by acetone, without its being necessary to have recourse to preliminary dessiccation. Its employment is in this respect more advantageous than that of carbon tetrachloride, and the last traces can be extracted of the fats of the residual cakes coming from the second or third pressure. These cakes are treated by pure acetone and then by a watery solution of acetone. When the vegetable milk is poured into the acetone, casein and albuminoid substances are precipitated and the fats remain in solution. It should be possible to separate by a single treatment the fats of the casein, thus avoiding the operations of oil extraction under pressure. The cost of the installations, the mass of acetone put into circulation, the cost of the distilling for recovery of the acid, the losses in the course of the manipulations, and the quality of the oil which is inferior to that obtained by pressure, are, however, all factors tending to limit the use of acetone to the mere elimination of the last traces of oil contained in the casein.

In the vegetable cheese obtained by coagulating the milk by the "tchachkao" powder, the oil may be separated by means of acetone; the cheese is dissolved in water and this solvent is added, which dissolves the fats and precipitates the casein and the albuminoid substances. The vegetable casein manufactured in Europe or of Indo-Chinese origin may be used for all the ordinary purposes served by ordinary casein.

It is however preferable, from the economic point of view, to treat soya beans directly in Europe for extraction of oil and casein, rather than to treat the Indo-Chinese casein with the necessity of removing the fats and the whey which it retains.

III. — INDUSTRIAL UTILISATION OF CASEIN.

Casein is an important product throughout the world, especially the casein which is precipitated from skimmed milk under the form of paracasein. Raw casein is placed on the market either moist under the name of curds, or freed from fat and dried to increase its keeping qualities and thus to render it more easily utilisable in certain industries. By final purification and chemical transformation, a large number of products are obtained for technical, medicinal or food purposes. But the widest field is now that of the

Manufacture of galalite. — As is the case with other albuminoid substances, animal or vegetable casein is rendered insoluble by formol with formation of a horny product, often transparent, susceptible of different applications, known under the name of *galalite*. By mixing casein with different products, gelatine, glycerine,

horn, camphor, nitro-cellulose, etc. products similar to galalite are obtained such as Keralon, Xylolite, etc.

For the preparation of the plastic mass, the casein freed from impurities is reduced to a fine powder in steel or granite cylinders and then mixed thoroughly, at 40°C, with water which has been made slightly alkaline by soda or ammoniac, or even with pure water. The mass should be rolled out or flattened in steam heated cylinders, to remove the water, and subsequently pressed in the hydraulic press. The dry product is then rendered insoluble by watery solutions of formol of concentration varying from 30 to 42 %. The time of immersion depends on the thickness of the sheets or other forms given to the casein which is subjected to this process of rendering insoluble.

The manufacture of the galalite with soya casein is carried out as follows : the pure casein which has been thoroughly freed from fats is dried and then finely triturated. It is left for 12 hours in a bath of boiling water to make it swell and to obtain a paste which is pressed and rolled out with a hydraulic press. Sheets are thus obtained which are then exposed to the action of formol, rendering the material incapable of putrefaction, and resistant to the action of water, alcohol, oil and ether. The substance formed is known as vegetable galalite.

A long series of patents exists of which some of the more interesting may be outlined here.

A patent (No. 106,446) of JUNG, BRECKER and KITTEL indicates a special process for obtaining a homogeneous product of superior quality, much appreciated in trade. Owing to their consistency, the fact that they cannot be attacked by acids, their resistance to heat, their isolating capacity and their low price, these products have very various industrial uses. They may be twisted, sawn, carved or planed, and they can be obtained in any colour desired by adding a colouring matter on beginning to work the casein. Masses are obtained with the appearance and stability of wood, ivory, horn, coral, marble, hardened rubber ; by a special process it is possible also to imitate amber or jade.

Patents Nos. 154,289 — 115,681 — 127,942 — 141,309. — All these relate to the preparation of galalite, a product which before the war absorbed considerable quantities of casein. The Company was supplied with skimmed milk from various central dairies, prepared the curd in accordance with its own method, and released the whey for the dairies. The curds were treated in a factory situated if possible in the largest centres of production ; the galalite was prepared by hardening with formol and was converted into sheets of different thickness.

In some cases alkaline carbonates are used to replace either wholly or partially the caustic alkalis usually employed in the preparation of the transparent masses of casein.

Galalite has a specific weight of 1.317 to 1.350 ; it is white, and resembles horn, but is less elastic than celluloid, difficult to cut, but easily coloured. It can be planed, swells in water after long immersion, becomes flexible, is absolutely odourless and can only be burnt with difficulty. It is employed for the manufacture of various objects ; knife handles, umbrella handles, chessmen, cigar holders, toys, keys of pianos, etc. In the electric industry, galalite is widely employed as a much appreciated isolating medium.

Various technical uses of casein. — Casein combined with alkalis or alkaline salts has a high adhesive power. This property is utilised for whitewashing walls ; by adding skimmed milk to milk of lime, products are obtained of a maximum covering power. The addition of copper or zinc caseinates for fixing lime in the interior of

breweries, malthouses, distilleries, oil-factories, wine cellars, etc. prevents the development of moulds and of other injurious germs. Casein, under the formula of skim milk, is used in the colour industry. By mixing sodium caseinate with the colours employed in the painting of porcelain and kneading the whole with water, colours are obtained resembling those employed for oil painting. In the fabrication of paper, casein is employed for making it more resistant and impenetrable by water. It is also used in the preparation of silk paper, photographic paper and for many other similar uses. Its adhesive property makes it valuable for gumming glass, porcelain and kitchen utensils. This gum may be prepared in the household by precipitating milk casein by means of acids, dividing it, washing it and then drying it partially, adding one fifth of powdered lime. It is also claimed that it is of use in clarification of wines, oils, etc.

The soap industry consumes to-day a considerable quantity of ordinary raw casein, and if no better use can be found for the curd, that of the soap industry is not to be despised, especially for the manufacture of milk soaps. Two qualities of casein soap is to be distinguished: 1. with casein soluble in water; 2. with casein soluble in alkalis. The former dissolves immediately in hot water, if it already contains the necessary quantities of alkalis; the second is only dissolved after the addition of alkalis. In practice, the second is preferred. Small quantities of raw casein are also employed in the manufacture of shoe creams, as the casein gives a brilliant polish when it is associated with strong essences of turpentine.

The employment of casein in fungicides and insecticides is wide spread and important. The casein is added to copper or arsenic salts, to different colloidal solutions (sulphur); its adhesivity, its function of protecting colloid, the increase of the drenching capacity of the different antiparasitic and fungicide solutions render it valuable and efficacious for such purposes.

Casein is also used in the preparation of the resins used to cover grafts or any abrasions of plants or the parts of plants that have to be sheltered from the air.

Mixed with cork powder it makes artificial corks for bottles and isolating material for refrigerators.

Another important utilisation of caseinates, especially of copper caseinate, is for the preservation of fibres, bags, etc. exposed to the damp and in contact with the ground, thus checking any destructive action of the cryptogams and bacteria. Considerable savings are thus effected in the industry.

Containers made in one piece from wood paste treated with casein, barrels, casks, etc., are of great importance in the beer and cider industry and that of other fermented beverages. Wine is kept very well by this means and the losses due to evaporation are much less than in the ordinary containers made of wood. Natural and concentrated musts are also preserved very satisfactorily and the danger is avoided of the solubilisation of different metals whether poisonous, such as copper or zinc, or harmless, such as aluminium, steel, tin, but at the same time prejudicial to the appearance etc. of the liquid, producing sometimes changes and deterioration in the characteristic "bouquet" of wine, etc.

Numerous cellulose products, such as peat, straw, various plant residues may be mixed with casein, after reduction to a paste, to form coatings which can be applied by rapid centrifugation to various types of container. These coatings may be hardened by formol which transforms them into galalite. They are inexpensive and prevent the walls of the containers from being attacked by decay, a great advantage in the preserving industry.

The uses of casein are well known for pasting together and rendering insol-

uble material in connection with the leather and timber industry, especially for plating or veneering subjected heavy to strains, such as those of aeroplane screws.

IV. — FOOD PRODUCTS BASED ON CASEIN.

The trials which have been made for the systematic use of casein in the manufacture of food products are almost exclusively confined to bread-making. It is not to be expected that paracasein, as obtained in the various manipulation processes, should present the same features as the casein of milk. If this latter much resembles the albumen of egg the same cannot be said of paracasein of food products prepared with a large proportion of that substance, for only the albumen introduced into the bread-making, under its pure form, and maintained under that form can give to the product so treated its pleasant taste of milk. The success of a new food product depends on its being appreciated and sought after by the public. If this essential factor is absent, it is of no use to prove scientifically its high nutritive capacity, the vitamin content and the other properties which might render it acceptable to the public. Taking this essential factor into account, all that will be done here is to indicate some of the more important patents relative to this question.

No. 134,297. — This patent relates to the regeneration of the original casein from milk. As this must be considered from the chemical point of view as neutral soluble dicalcic casein, it is a question of transforming the tricalcic insoluble casein compound or an intermediate product, obtained by precipitation with rennet, into a product less rich in calcium.

By precipitating the albuminoid substances by means of acids (the natural souring of milk), an insoluble casein is obtained poor in lime and acid. The regeneration of the insoluble rennet casein or paracasein coming from the cheese industry is obtained by the addition of substances which remove lime, forming thus salts that are easily soluble. These substances are : acid casein, lactic acid, sugar of milk, other sugars, glycerine, phosphoric acid. In this way there is obtained from the friable mass during the kneading a plastic mass which shows a neutral reaction ; diluted with water, it gives a liquid closely resembling milk, both in taste and odour and in appearance. The essential condition consists in adding a just sufficient quantity of acids to the rennet, so that the final product may have a reaction which is nearly neutral.

No. 98,322. — Taking as a basis the fact that the casein obtained from whole milk, owing to the incorporation of very small fat globules, is more easily digestible than that obtained from skim milk, M. BERNSTEIN proposes, so as to prepare a food which is easily digestible, the addition of 10 g. of flour per litre of skimmed milk, after first mixing the flour with a small quantity of milk, before treatment with rennet. In this way there is obtained, after elimination of the whey, a mixture of casein under the form of very fine flour, which can be consumed as such or well baked.

Others, such as M. LEHMANN, obtain (patent No. 364,784) a food product which can be caked, fried, roasted, and which properly diluted yields a milk beverage ; when the mass is roasted it takes a fine brown colour, is appetising and has the taste of meat. By adding meat cut into small pieces, the whole is less expensive and of improved taste. Adding flour and water it is possible to prepare beignets, edible pastes, pastry and all dishes which have flour as a basis. Sauces can be made or their flavouring improved.

Preparation : moist casein obtained by natural souring of milk is mixed with small quantities of wheat gluten, about 15 g. of moist gluten for the casein obtained from one litre of milk. In any case the quantity of gluten employed should be just sufficient to obtain a powder which when dampened and worked gives a mass which can be kneaded. The mixture is dried at 50 to 60° and ground fine. The casein powder obtained in this way has not lost its capacity for swelling and remains very easily digestible and absorbent.

The above patent has been since modified (No. 367,519) by the substitution of albumen for wheat gluten, employing the albumen of egg as protecting colloid.

No. 216,234. — This patent of M. BARCHLER has been tried by the "Ovolactol-Actien-Gesellschaft". The albumen of milk is guaranteed to be capable of indefinite preservation and to have a rising capacity similar to the albumen of egg. Undoubtedly Ovolactol can be preserved longer than other similar commercial products although after the different treatments it has no longer all the properties of pure egg albumen.

Ovalactol is already widely used as a substitute for white of egg in pastries and in the edible pastes factories and it has the advantage of placing on the market food products of a considerably higher nutritive value, at no higher cost.

The patent 94,406 may also be of interest from this point of view. After thoroughly mixing for several hours one kg. of casein or paracasein with three-quarters of a kg. of fat, a uniformly pasty mass is obtained which in aspect, consistency and kneading capacity, entirely resembles a flour paste. This paste is prepared in the usual way and is baked in the oven at a temperature if possible constant between 150 and 200°C. Loaves, etc. take a fine yellow colour and the final product has the appearance and taste of pastry made with flour. So as to modify the taste, spices, saccharine, salt, albumen, etc., may be added. The inventor (Dr. LIEBRECHT) considers this preparation as the ideal bread for diabetic patients, as it contains plenty of albumen and no carbohydrates. If it is not desired to employ it for such cases, sugar may be added. A product is thus obtained which is of great nutritive value.

From the above statement it appears that the utilisation of raw materials under the form of casein meets satisfactorily the various requirements of the industry as of food supply and constitutes an important element of first importance in the rural economy.

Statistics relating to the production and consumption of casein in the different countries (1) show the great development during recent years of the production and utilisation of this by-product of animal (milk) industry and of plant (soya-bean) industry.

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FORESTRY

The Problem of the Choice of Seeds in Forestry.

In agriculture and horticulture the best results of selection and improvement of seeds have already been obtained and new types and varieties of plants are yearly produced which are more profitable to the grower. The great importance also of the origin of seeds for forest crops is now generally understood, but as yet world forestry is only beginning to make practical applications of this knowledge.

Why then is silviculture so backward? The explanation lies in the difference between agriculture and silviculture. In agriculture with annually recurring seed times and harvests it is easy to ascertain fairly quickly the different results of the use of seeds of various origins. But the longevity of forest trees prevents the forester from making personally similar observations, the duration of which may sometimes even exceed that of human life. It is often not even within the power of silviculture to modify radically the constitution of the forest.

Forest species however, like other plants, obey genetic laws, and experiments hitherto made prove this fact.

Whereas formerly with an extensive silviculture, to quote M. GUINIER (France) this new science of forestry might be considered superfluous, this is not so now, when the question is one of modifying at times even very extensive forests, of re-forestation bare ground and of introducing on all forest lands the plant types which will yield the product best in quantity and quality. In such works as these genetics must accordingly occupy an important place.

Forestry writer of various countries (M. ROMELL for example for Sweden, M. VAN LONTHUYZEN for the Netherlands, M. CABIANCA (Italy) for Mediterranean

countries especially Italy, all agree in dwelling on the deplorable results due to the fact that in former days no attention was paid to the origin of the seeds used. They point out also the efforts made in all these countries to remedy mistakes of this kind in the past. In Sweden towards the middle of the XIXth century as there was a shortage of home-grown seeds, afforestation was largely carried out with seeds of uncontrolled origin, and with large quantities of imported seeds, mainly from Germany. The forest trees springing from these southern seeds had ordinarily in their youth a more rapid growth than the trees of indigenous origin, but they soon began to degenerate. This degeneration, generally, assumed the aspect of a catastrophe when the trees had reached the age of about 30 years and most of these forests never lived to 40 years, and produced only wood of inferior quality, scarcely fit for anything but firewood. In the Netherlands foreign seeds were also used, especially at the time when the importance of the origin of seeds had not yet been recognised. Researches made later have shown that forest stands which had done badly in different localities had been mostly planted in special years when the crop of forest seeds of the country had been insufficient and when seeds of unknown origin, bought from foreign seedsmen, had been sown.

M. GALLOT (Belgium) gives an account of the results of experiments made in Belgium with seeds (mainly of Scots pine) obtained in various countries and shows that seeds of ascertained indigenous origin gave the best results, while trees grown from seeds of foreign origin (especially from the South of France or Russia) were the most backward in growth. Many further examples could be mentioned all proving that the result of neglecting to take the origin of seeds into consideration is not only a diminution in the yield of the trees but also that they are less resistant to damage from snow, frost and diseases.

Besides the right choice of seeds the experience of foresters is that the employment, really suitable varieties is among the most important elements in a sound silviculture. MESSRS. GUINIER (France) and KOLESSNIKOFF (U. S. S. R.) recommend the production, by crossing, of varieties : (1) most resistant to frost ; (2) to disease ; (3) able to stand drought ; (4) adaptable to the various strongly saline soils ; (5) distinguished by good morphological qualities ; (6) by abundant resin content ; (7) by tannin content ; (8) by more rapid growth, etc.

All the experiments made show that in the extension habitat of a single species of tree there exist a more or less large number of local varieties. The detailed study of these "*petits espèces*" (as M. GUINIER calls them) is of great silvicultural importance, showing which are the advantageous properties that can be developed in various hybrids resulting from spontaneous and artificial crossing of various species of trees.

Before science can obtain new and valuable results in this field, all foresters must at least regard it as a first principle only to sow well known and approved seeds in nurseries or on areas to be afforested.

The persistence of earlier customs is still very strong and the struggle against them is a difficult matter. Nothing is learnt from the many failures, the fine results of research or of experiment count for little, and most foresters, especially in years of poor local production of seeds, continue, in accordance with old habits, to buy the seeds they require from unknown seedsmen and from distant countries. Another difficulty, mainly administrative (GUINIER), is that the sums set aside yearly by foresters for seed collection do not usually vary in amount. Variations of fertility of trees however make it necessary to provide for larger expenditure on collection and a larger supply of labour in good seed years. Moreover even when the surplus seed is collected, the collectors are usually seedsmen who

frequently despatch it to countries for which the seeds are not best suited. To cheapen collection, seeds from diseased seed-bearers may even be included.

To remedy this state of affairs it is the general desire of experts to create organisations in the various countries and districts, and even international arrangements for guaranteeing the crop, the preparation and distribution of seeds, with vigorous supervision of their origin. Experts of various countries are almost all agreed in saying that the State should take the initiative in this organisation. M. CABIANCA is of opinion that the State should encourage the initiative of private individuals, while M. GUINIER considers that the best solution would be to place these organisations under forest administrations or research stations.

M. VINCENT (Czechoslovakia) holds that such an organisation, controlled by the State, cannot do without the collaboration of private enterprise. M. VINCENT does not wish to oppose the activity of commercial firms, but he explains that silviculture has not only the right but also the duty of requiring that these firms guarantee, on their own responsibility, the origin and quality of seeds which they have issued. He thinks that this guarantee can only be assured by a system of certificates issued under State control by research stations to seedsmen enabling them to prove to purchasers of forest seeds that their goods have the required qualities. There are already many countries where this procedure is followed. In Sweden for example (ROMELL and WIBECK) the research station which since 1885 has controlled the origin of seeds of all districts of the kingdom has marked the seed-bearers from which the seeds are taken. Later on observations were made not only of the young plantations but also of the seed-bearers from which they had sprung and the results were shown in a number of statistical tables. From these data it is clear that seeds coming from neighbouring countries have great cultural advantages.

The systematic delimitation of zones within which seeds may be considered as the same and transferred without objection, is a question of very great practical importance. Certain authorities consider that the boundary of these zones should be the line of isotherms; others consider the average summer temperature as giving the correct boundary. The most definite pronouncement made from this point of view (among others by Mr. MACDONALD (England), is that in any case seeds should be employed which come from countries where the climatic conditions are identical or at least very similar to those of the place of afforestation. Legislative measures have even been taken in some countries to prevent the importation of undesirable foreign seeds. There are laws which prohibit the importation of certain seeds (Swedish Law of 1882), while very high protective duties sometimes make importation difficult.

In Germany there is also a system of control of forest seeds. The Swiss drying places have also been placed under government control since 1916. In Czechoslovakia, Austria and in many other countries active measures are taken to procure seeds collected from selected trees and suitable to the situation for which they are intended.

The desire for an international agreement on this subject is increasingly expressed.

The resolutions of the 1st International Forestry Congress, Rome 1926 (embodying in particular the proposals of MM. GUINIER, CABIANCA, KONSEL and VAN LONKHUYZEN) had already drawn the attention of the world's foresters to the international importance of applications of silvicultural genetics.

Researches made since the Congress have subsequently been reported. M. VINCENT has communicated the results of his observations relating to the effect of keeping seeds for several years on the persistence of their germinative capacity. He has

also examined the cones of various conifers and he has found that the proportion of sound seeds of the lower central and upper thirds of cones of spruce and Scots pine is equal to 80 : 100 : 53 and that the number of empty seeds is minimum in the central third and maximum in the upper third. The absolute weight of seeds is also maximum in the central third.

M. SCHMIDT (Germany) is endeavouring to find a method by which the origin of seeds can be determined by simple examination. The starting point of his researches is that the reaction of seeds to frost, light and temperature differs according to their various origins. He draws conclusions regarding origin by examining the external form, the size and the chemical composition of seeds and cones.

M. WIBECK desires an improvement in drying grounds making it possible to separate sound from empty seeds of the same specific gravity.

M. CABIANCA uses a new drying ground with electric heating, which is more simply manipulated and is also more effective than the earlier types.

The various investigations are not yet complete and must be continued for some time still. It was however pointed out by M. GUINIER, on the occasion of the International Congress of Forest Research Stations held at Stockholm in 1929, that national organisation in each country as well as the international organisation of exchange of these seeds could be effected without waiting indefinitely for the results of researches. To effect such organisation it is, in his opinion, necessary that in each country a list should be made of seeds which could be made available for the exchanges, such list to give precise information regarding the species of tree, the variety, the origin, the germinative capacity of the seeds and also to indicate the quantities and the prices. The lists so compiled would be sent to forest administrations and research stations in other countries. Each would then make its desiderata known and the exchanges would be effected, being adjusted payments by offset of costs. According to this proposal the International Union of Research Stations should establish the bases of that organisation, and assure its working.

World forestry progress requires such collaboration, not only between European countries, but also between all countries in the world. In fact at the present time European trees are planted as far as New Zealand and Chile (GUINIER) and North American and Japanese trees are becoming every day more important in European forests.

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(2) List of abbreviations: bimens. (twice monthly), bimestr. (two monthly), hebd. (weekly), int. (price for the interior), étr. (foreign countries), irr. (irregular), mens. (monthly), N. S. (new series), sem. (half yearly), trim. (quarterly), v. (volume).

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Notes.

Meteorology.

ORGANISATION OF A CHAIN OF METEOROLOGICAL STATIONS IN TRIPOLITANIA. -- At present the chain is made up of a central observatory in Tripoli, 6 principal observatories at Azizia, Garián, Misurata Marina, Sidi-el-Mesri, Sirte and Hon, 14 principal stations, 16 rainfall and temperature recording stations, 31 rainfall recording stations in use and 9 more under construction.

WEATHER FORECASTING BY SOLAR RADIATION. -- As a result of 30 years' observations Dr. C. G. ABBOTT, Secretary of the Smithsonian Institute at Washington D. C., believes he has found a constant relationship between the quantity of solar radiation and the temperature at a given point on the earth's surface, which would allow of the prediction of weather a week in advance.

At the Mount Montezuma Observatory in the Atacama desert, Chili (altitude 2700 m.), he found that the sun does not always give the same amount of heat by radiation, but that it varies from day to day. This fact retains its value even if it is allowed that the measurements are influenced by atmospheric conditions. At Washington Dr. ABBOTT found that solar radiation and terrestrial temperature change in the same direction from mid-November to March and during May and in opposite directions from June to mid-November and during April. He considers these results highly promising. He proposes to study systematically not only temperature but also atmospheric pressure in relation to solar radiation and considers that then it will be possible to make forecasts with certainty over considerable periods. Details of his work are given in *La Meteorologia pratica*, Montecassino 1930, anno XI, n. 5, p. 275-276.

THE 'HUMMING' OF AERIAL WIRES AND ATMOSPHERIC DISTURBANCES. -- M. Albert NODON has made a study over some years of the peculiar 'humming' or 'singing' sound made usually in still air by the vibration of overhead wires. He used one wire running N and S and another E and W, and found that the nature of the humming can yield interesting meteorological information. Usually one wire only would vibrate and the vibration preceded atmospheric change by about twenty hours. The direction of the following atmospheric disturbance would be perpendicular to that of the vibrating wire. In western Europe vibration of wires running N and S corresponds to disturbances coming from the Atlantic, and vibration of wires running E and W heralds the change from northerly to southerly winds or the arrival of storms from the S. The intensity and duration of the probable disturbances are related to the intensity and persistence of the vibration of the wire.

The humming is not produced when the sky is cloudy or foggy, but only when it is clear or when small cirrus or cirro-cumulus clouds are passing towards the zenith ('mackerel sky'). M. NODON explains the difference as follows:-- The vibration of wires is apparently due to certain electrostatic attractions which cause successive series of small masses of air highly charged with electricity to circulate rapidly over the wires. These masses of charged air in motion may be compared to the broken cirro-cumulus clouds which make up a 'mackerel' sky. On the other hand the continuous attraction produced by equi-potential surfaces, such as clouds, produces no vibration of the wires.

Thus M. NODON considers that the systematic study of the humming of aerial wires by means of an amplifier would provide useful data for weather forecasting. (*Comptes rendus de l'Académie des Sciences*, Paris 1930, tome 191, no. 20, p. 959-961).

T. B.

Soil Science.

DETERMINATION OF THE SOLUBLE FERTILISING PRINCIPLES IN SOIL BY ELECTRIC ULTRA-FILTRATION. — This ingenious method invented by M. M. KÖTTGEN and DIEHL, (Pedological Laboratory of the Forestry Institute, Giessen, Germany), consists in passing an electric current through an aqueous suspension of soil and at the same time filtering the dissolved substances through a collodion membrane. The filtrate runs into funnels fitted with stopcocks which are opened every hour. One funnel collects the bases (lime, potash, etc.) which are attracted to the cathode and the other the phosphoric acid which goes to the anode. Distilled water is continually poured into the electric filter to replace the liquid drawn off. Complete filtration takes 8 hours, but the fertilising principles are mostly dissolved within 4 hours.

This method not only determines the total content in soluble fertilising principles of the soil but also indicates the speed of solution by means of colorimetric determinations made each hour as the filtrate is removed. This makes it possible to distinguish those readily soluble from those more or less adsorbed by colloids which are not dissolved until the last hours; it is also seen that the part dissolved during the first hour is very much the most soluble and is probably that which is immediately available to roots.

By tabulating the decreasing values obtained from hour to hour for each element it is possible to see the character of a soil and to judge its requirements in fertilisers.

A detailed description of the method with figures of the apparatus is given in the *Zeitschrift für Pflanzenernährung, Düngung und Bodenkunde*, Band XIV, Heft 1-2, S. 65-105, and *Die Ernährung der Pflanze*, Band 26, Heft 20, S. 453-456.

IODINE DISTRIBUTION IN CERTAIN TYPES OF CLIMATIC SOILS. — The distribution of iodine has been studied by M. M. BECK and SCHLACHT in clayey steppe soils, in brown sandy-clayey forest soils and in podsols. It was found that steppe soils are richest in iodine, specially in the surface layers and the humus horizons. The more these soils are podsolized the less iodine they contain. On the other hand, the brown forest soils and podsols contain their maximum of iodine in the B alluvial horizon, while the surface A¹ layer is poorer in iodine than the mother rock. (*Zeitschrift für Pflanzenernährung, Düngung und Bodenkunde*, Band XVIII, Heft 5-6, S. 274-281, Berlin 1930).

SOIL STUDIES IN EAST SERBIA. — Prof. STEBUTT (Belgrade) obtained the following main results:—

Soil fertility depends on the relief, the climate and the geologic age of the soils and the mother rocks.

The best soils are found in the low districts where the soil deposits are mellow and contain sufficient lime and clay. The most fertile land is the calcareous alluvial deposit of the Timok, then comes the 'Smonitzas' (humus soils) of the valleys. There are exceptions to this rule in the narrow valleys and ravines and the stretches of humus soils which have a surface that does not yield to tillage.

The least fertile soils are the podsols and skeleton soils. They are of little cropping value but are suited to afforestation. The poor quality of the podsols of Eastern Serbia is surprising in view of the good results given by many podsols in other parts of Serbia. The difference lies in the quality of the land which has undergone podsolisation; in Eastern Serbia they are formed by the disintegration of 'gabbros' and serpentines which are always unproductive.

The monograph of M. STEBUTT is published in *Glasmik*, Bulletin of the Ministry of Agriculture of Jugoslavia, an. VIII, fasc. 31, p. 1-55, Belgrade 1930.

Land Reclamation.

TRANSFORMATION OF ROCK INTO CULTIVABLE SOIL WITH EXPLOSIVES. — M. A. PIÉ-DALLU breaks up rock, such as the sandstone with calcareous cement on the Algerian

coast, by means of explosives and thus transforms it into arable soil. Mines are dug 1 to $1\frac{1}{2}$ m. deep and about 2 m. apart and charged with from 1 to 3 cartridges of 100 to 125 gm. Groups of 4 or 5 mines are fired simultaneously by electricity.

Experiments carried out over 2 years on 100 hectares in the outskirts of Algiers have all been successful. The land having a value of from 70,000 to 80,000 fr. per ha the work could be carried out without fear of the cost, which was from 6000 to 8000 fr. per ha. The stone was broken into pieces of varying size; the largest were sold as building stone and for road metal and thus nearly covered the expenses. The remainder varied from a granular consistency to stones the size of a fist and formed a soil suitable for growing early vegetables, vines and fruit trees.

Dressings of sheep manure, green manure and a complete chemical fertiliser made it possible to obtain a first crop of potatoes with a yield of 9 for 1 and a second crop with a yield of 10 for 1, between rows of vines and fruit trees. The potatoes grew without irrigation or watering, finding sufficient water penetrated into the broken up ground during the winter rain. The vines and fruit trees remained green in spite of scorching summers. (*Comptes rendus de l'Académie d'Agriculture de France*, Paris 1930; tome 16, no. 7, pp. 247-250).

T. B.

Fertilising.

FERTILISATION BY THE LEAVES. — In the *Vie agricole et rurale* (Paris 1930, no. 37, p. 106; no. 43, p. 260) Prof. J. P. WAGNER gives interesting information about this new method of applying chemical fertilisers to plants. The roots have hitherto been regarded as the only organs capable of absorbing the various nutrient principles normally supplied by the soil, but careful experiments have shown of recent years that the leaves are also capable. At the Agricultural Experiment Institute at Munich comparative pot experiments have been carried out with tobacco, mustard and barley. The soil of the control plants received a complete fertiliser, of the experimental plants a fertilizer lacking one essential element. The experimental plants lacking nitrogen were sprayed with a solution containing 0.875 gm. of ammonium nitrate per pot. The plants thus treated developed perfectly and produced more dry matter than the controls. The best results were given by sprays of ammonium phosphate, then by potassium chloride; calcium and magnesium salts produced no effect.

M. MAGNAN (Montpellier, France) has studied this question since 1912, not in the laboratory but on crops in the field. He finds that in a dry season fertilisers on the soil are not able to reach the roots. He has determined which substances are the most active when applied as a spray and has also added a non toxic insecticide as a protection against pests.

M. WAGNER considers the new process of fertilising by the leaves is of great importance in its application to fruit trees, because of the difficulty of applying fertilisers which are entirely available to the roots.

NEW POTASH RESOURCES IN THE UNITED STATES. — This *Review* has frequently reported the efforts of the United States Government to get rid as far as possible of the necessity for importing European potash salts by utilising the various sources of potash available within the country, such as deposits of potash salts, feldspar, glauconite, seaweed ash, recovery of the potash liberated in cement furnaces, etc. Recently it has been attempted to extract potash by various methods from Wyomingite (kind of leucite found in Wyoming), from polyhalite (sulphates of potassium, calcium and magnesium) and from alumite (sulphates of aluminium and potassium). The following are some of the processes used.

Leucite. — To volatilise the potassium (about 12 % K_2O in the samples tested) the mineral is heated alone or mixed in various proportions with $CaCO_3$, $CaCl_2$, CaF_2 and $NaCl$ in an electric furnace. Over 25 % of the potassium is liberated in 40 minutes from leucite heated alone to $1500^\circ C$. The volatilisation is increased with the addition of CaO , CaF_2 , $NaCl$ and $CaCl_2$. The last is the most effective; mixed with CaO it liberates all the potassium below $1200^\circ C$. This process is thus practicable from a chemical standpoint and in order to make it economically practicable it is only necessary to find a suitable electric furnace, which is what the investigators are now aiming at.

In the southwestern part of the State of Wyoming the occurrence of several raw materials of the chemical fertiliser industry (leucite with 12 % K_2O , phosphorites, lime,

oil) seems propitious for setting up the industry there if economic manufacturing processes can be found. A process is being studied for the simultaneous volatilisation of K_2O and P_2O_5 by heating a mixture of leucite and phosphorite in an electric furnace.

Polyhalite. — This mineral which was recently discovered in extensive beds in Texas and New Mexico may become an important source of agricultural potash. Attempts at using it have already been reported in this Review (1930, no. 11, p. 408). A more recent process consists in extracting powdered polyhalite with a solution of ammonia and CO_2 ; the calcium and magnesium are precipitated as carbonates and the valuable fertilisers, potassium sulphate and ammonium sulphate, remain in solution.

Alunite. — Alunite is found in several of the western States but the best deposits are in Utah. To utilise it economically it is necessary to obtain the sulphate of potassium and aluminium both in a pure state and so to eliminate all iron and silica. A method of treatment with hydrofluoric acid gives satisfactory results. (*The American Fertilizer*, Philadelphia 1930, Vol. 73, No. 7, p. 19-20).

GROUND LIMESTONES FOR LIMING LAND. -- Interesting information on this subject is given by M. A. ROLET in the *Vie Agricole et rurale* (Paris 1930, No. 46, p. 307-308).

The amorphous soft limestones are more effective than the hard crystalline types. Fineness of grinding is important for good results, but will not make the hard rocks as effective as the soft ones. Before installing a mill it is advisable also to make laboratory tests of the degree of solubility in carbonic water of the limestone to be ground. The farmer should on his part require definite information about the place of origin and degree of solubility of the ground limestone he buys.

The solubility depends largely on the fineness of milling. In fact the degree of division, *i. e.*, the active surface, of the limestone is of more importance than the weight or bulk applied. Experiments have shown that to correct soil acidity completely* it is necessary to use 8 times as much limestone with grains 2 mm. in diameter as of a fine powder not exceeding 0.2 mm. The degree of fineness is specially important on grassland where the ground limestone cannot be thoroughly mixed with the soil by harrowing.

It should be remarked that the grinding of soft may be more costly than that of hard limestones. This apparent paradox is explained by the porosity of the soft stones which retain much water which has to be first dried off, causing extra expense. But even so the soft stones are more economical in the end owing to their greater solubility.

M. ROLET expresses the wish that the sale of ground limestones might be submitted to similar regulations to those which control the sale of chemical fertilisers, which would make it obligatory to state (1) the origin of the limestone, (2) its percentage in total $CaCO_3$, (3) the percentage of $CaCO_3$ soluble in carbonic water (determined by a standard method), (4) the fineness of milling, determined by a standard sieve, and the percentage of remainder on the sieve.

In Germany the conditions of sale are as follows: *Ordinary limestones* -- 80 % must pass through a mesh of 0.75 mm. and the remainder must not have particles greater than 2 mm. *Fine limestones* -- 80 % must pass through a mesh of 0.3 mm. and the remainder must not exceed 1 mm.

In England ground limestones are required to pass through a mesh of 0.15 mm. to the extent of 90 %.

(Notes on other research in connection with ground limestones will be found in this Review, 1930, No. 2, p. 51, and No. 3, p. 96).

T. B.

Ecology.

RAINFALL AND CANE SUGAR YIELD. — Excessive rainfall reduces the sugar content of canes, as is clearly shown in certain islands which have plantations on the windward side (exposed to rain-bearing trade winds) and on the leeward side (protected by mountains from such winds and relatively dry). The sugar content is higher in the leeward than in the windward plantations. The following table shows the figures for the sugar crop of 1929-30 in the island of Réunion.

Plantations	Cane crop	Sugar produced	Yield in sugar		
			maximum	minimum	average
	tons	tons			
Leeward (8)	248 773	28 450	12.31 %	10.02 %	11.42 %
Windward (7)	250 851	22 570	11.44 %	7.33 %	9.26 %
Total (15)	440 024	51 020	—	—	General average 10.20 %

The lowest yield (7.33 %) was thus obtained on the windward side. The divergencies from the general average of 10.20 % are as follows :

Leeward region	1.22 %
Windward region	0.94 %
Divergence between the 2 regions	2.16 %

Or, in other words, in the relatively dry leeward region 100 tons of cane yielded 2.16 tons of sugar more than in the more rainy windward region. (M. RIGOTARD, *Revue générale des Sciences*, Paris, 1930, tome XLII, No. 12, p. 355).

T. B.

TROPICAL AND SUBTROPICAL AGRICULTURE.

Systems of Agriculture and the Position of Tropical Agriculture.

I.

It has always been taken for granted, that agriculture in the tropics has its own peculiar character. This need not be wondered at: the tropical flora differs very much from that in a northern climate, tropical soils show features not common to our European soils; lack of winter, an abundance of crop pests and, in a large part of the tropics, an extensive rainfall and high degree of humidity, all these factors make conditions of plant production different from those we are used to.

And so as a matter of convenience tropical agriculture was distinguished from agriculture in countries at higher latitudes.

But, when exploring the field of tropical agriculture and its science, one looks for its boundaries, trouble begins. For if "tropical agriculture" does not mean anything more than agriculture in tropical countries, the difference from agriculture in other countries is only a geographical one.

This question brings us directly in contact with the question of the classification of types of agriculture.

Nobody will deny that the ways in which agriculture is practised the world over show very large differences: agriculture in humid west European countries differs greatly from that in the large arid plains of North America and perhaps still more from Chinese and Japanese agriculture. As there are large differences between agriculture in different parts of the world, it must be possible to distinguish different types, each of them practised under certain conditions.

This problem of the classification of types of agriculture has already been attacked several times and from different points of view.

CHEVALIER (1) gave a system, which he called a bio-geographical one. He points out that ecologists do not seem to take much notice of cultivated plants and of the influence of culture on native vegetation. But in every part of the world a very large part of this vegetation has been supplanted by another: either cultivated plants or secondary formations occupying land that had been planted before with one kind of crop or another. He recalls the fact, that the so-called virgin forest of Central Africa is not virgin at all, but largely of secondary formation. CHEVALIER concludes his introduction by saying, that in a general way all systems of agriculture which are practised in different parts of the world are adaptations to the existing conditions of topography, climate and natural vegetation and also to the civilisation acquired by its performers.

A study based on this thesis might have produced an important contribution to agricultural geography. But in the classification following this introduction other lines of investigation are followed.

It is in accordance with facts to distinguish between herding and agriculture proper. This last is divided into two groups of systems: extensive and intensive. But with this distinction the classification of CHEVALIER is not based more on the adaptation to topographical, climatic and natural conditions, than on conceptions belonging to the domain of farm management.

Every system may be practised extensively or intensively and this is the cause of much confusion. So CHEVALIER places under the heading "extensive without use of draught animals" both the "rays" (2) system and the periodical clearing of forest on behalf of one or two crops, and agriculture on terraces in the hill country of South Eastern Asia. But the last often is a very intensive system although no use is made of plough or dung or artificial fertiliser. And tobacco culture on Sumatra plantations, which practise a very intensive system, is based on a short period of clearing, followed by a long fallow in which forest and brush occupy the ground for several years. Systems as different from an agricultural standpoint as Chinese rice culture, plantation culture of perennials, and European agriculture as practised in Denmark, Holland, Belgium, etc. are put together in one division, that of the intensive systems.

AHRENS (3) in 1927 published a study in which he by classification of the agricultural systems tries to show the dependence of these systems on the surroundings in which they developed. According to AHRENS these systems depend on human and geographic conditions. As it is his purpose to show the dependence on the last mentioned, he tries to separate the two influences as far as possible. Therefore he based his study on the different types of landscapes (*Landschaftstypen*) PASSARGES.

AHRENS gives a mass of information about agriculture as practised by native peoples of the tropics and subtropics. He arranged it according to the classification PASSARGES but brought a new principle into account. He divided the agricultural

(1) *International Review of Agricultural Science*. Rome 1925, No. 3, p. 711.

(2) In practising this system large quantities of wood and brush are heaped and burnt on those patches which are destined as nurseries for the rice plants. Not only the ashes are useful but also the high temperature of the soil caused by the fire. Several studies have been made in this connection which all showed the soundness of the system from an agricultural point of view. The system however is destructive to forest growth.

(3) R. AHRENS, *Wirtschaftsformen und Landschaft*. Hamburg, 1927.

system into two groups, the first not making use of a plough and the second using the plough.

It is not to be wondered at that in these two groups, classified in relation to the landscape in which agriculture is practised, the most divergent types are brought together. Systems differing as much from one another as : primitive agriculture in temporary forest clearings, agriculture in inundation basins after the water has flowed off, grain culture in prairie regions, rice culture on terraced irrigated fields, and agriculture in desert oases, are all put under one heading as not using a plough. His classification becomes still more complicated as he also takes into account in which time of the year crops cover the ground and so distinguishes between : rainy season — dry season — and summer farming and farming the whole year round.

But, does it make any difference in the practice of farming or in its underlying principles, if a forest plot is cleared in the dry season and planted with rice in the next wet one, or by lack of a dry season in an arbitrary part of the year ?

Also ECKARDT (1) and WOHLTMANN (2) are aware of the influence of natural conditions on the character of agriculture. But the former pays very much more attention to the different agricultural plants and their adaptability to different conditions, than to the agricultural systems of which they form a part. And WOHLTMANN tries to give a valuation of tropics and subtropics according to their productive capacity and classifies them according to rainfall. But he does not indicate how farmers in these different regions managed to get their systems in accordance with it.

When agriculturists have given descriptions of farming of certain areas these have been almost always of limited extent. And although agricultural practice in such areas does not differ so much as in remote parts of the world, they always succeeded in showing the relation between agricultural practice and its surroundings. Many brilliant studies of French, German and American agronomists show the possibility of a study of this subject based on agricultural principles, and recent English publications on agriculture in the British Isles prove it again. These studies are not concerned with the influence of climatic and other environmental factors on different crops but with the practice of farming and its adaptation to environment.

Agriculture cannot be divided according to a simple set of complementary properties ; it is too complicated. It is therefore necessary to ask in the first place, what is the most characteristic farming practice.

It may be asked if it is of more than theoretical value to discuss the question of farming systems. Instead of discussing the question at length it will be better to give some quotations from a report of STOCKDALE (3) on agriculture in Sierra Leone.

After having given a description of existing conditions M. STOCKDALE remarks : " Sierra Leone can be pictured as a country passing through those evolutionary phases which similar wet and undulating countries in the East must have gone through in the earlier stages of their history. Cultivation of rice is passing from the hilly lands after exhaustion to the lower swampy areas. The latter cultivation is

(1) W. R. ECKARDT: Die Landbauzonen der Tropen in ihrer Abhängigkeit vom Klima. Beihefte zum Tropenpflanzer. Berlin 1911.

(2) F. WOHLTMANN. Handbuch der tropischen Agrikultur. Band. I. Die natürlichen Faktoren der tropischen Agrikultur.

(3) Tropical Agriculture. Trinidad 1930, Vol. VII, No. 9, p. 251.

the more permanent and should be encouraged. The cultivators can be assisted greatly by lessons which can be translated from the East and it seems very desirable that matters concerned with drainage, terrassing, cultivation and regulation of water should be investigated in Sierra Leone". "Sierra Leone has an indigenous highland coffee, which is of good quality. Liberian coffee does well and the growth of Robusta types is promising. More has to be learned, however, in regard to the cultivation of the latter coffees in Sierra Leone, as such questions as shade requirements and the treatment of the soil have not yet been fully investigated".

In the first quotation STOCKDALE expresses the idea that experience of Oriental farmers may be of use for Sierra Leone. The lessons of the East should be translated into West African language, that is to say, it should be investigated how far the Oriental farming system could be applied in West Africa and what adaptation to the new country would be necessary. STOCKDALE does not speak about an investigation of rice, or peanuts, or irrigation, or ploughing, but about a certain farming system of which those other subjects form part.

But to start such an investigation, to translate the lessons from the East, it is necessary to know that Eastern system, to know what characterises it, to know the language of the East.

STOCKDALE is quite right in borrowing from the East and not from Europe. Europe too is rich in experience, but its experience is of small value for West Africa. It is from the East that the lessons have to come.

It might be useful to point out a difference between the ideas expressed by CHEVALIER and the advice of STOCKDALE. In the classification of the former there is place for a "complete system", in which plough, draught animals, fertilising of the soil, etc. have found their place. European agriculture has been the standard by which other systems are measured, being regarded more or less as the ideal system. STOCKDALE's advice is based on the idea that there is no such thing as an ideal or a complete system. There are several systems, which are of the same value, and each of them may be complete in itself.

The second quotation in regard to coffee-growing does not mention the lessons from the East, but concerns investigations in relation to shade and soil management. However, it is not European agriculture that will be able to give advice in these matters. Perhaps experience gathered in the practice of tropical plantation agriculture may be of value in this case. But this experience has not much in common with that of the farmer of the Orient. It is another system, differing from Eastern agriculture as well as from European, that will find a place on the hills of West Africa. These few quotations may suffice to show the practical importance of the question of agricultural systems.

* * *

Wherever man occupies himself with plant production, either for direct use or to be converted into animal products, his labour and efforts are directed to the establishment of a crop and to the protection of that crop against anything unfavourable to it.

It may be that adverse conditions predominate and that it will not be possible to gain a livelihood in this way. The only method by which it may be gained is then to take the natural vegetation and to convert it into animal products. The aim of the stock farmer is to get sufficient grazing grounds for his cattle and to protect them against adverse conditions.

Both classes may live together in the same part of the country, the arable farmer occupying the localities more favourable to plant production.

It may be that the arable farmer makes use of animals to facilitate his labour, to make it possible to plant a larger acreage, or to get better crops from the same acreage. It may also be more profitable to turn his produce either partly or entirely to his cattle. But this makes no difference in principle: this farmer is occupied first and foremost with crop production.

It may be profitable to the stock farmer to produce crops, to provide food for his cattle when nature does not produce sufficient, and to protect in this way his stock from heavy losses.

Economic and social conditions may change so that it will pay to have more cattle on a certain acreage or more productive cattle, and this may induce the stockbreeder to occupy himself with native vegetation, to ameliorate it and to make it productive.

There is a tendency under certain advanced social and economic conditions to make stockbreeding profitable to the arable farmer and to force the stockbreeder to occupy himself with crop production. The result is that a class of men, formerly not interested in crop production or only to a less extent now also becomes interested in it.

The development of agricultural machinery has made it possible to gain a livelihood by crop production where it was impossible to do so before this machinery existed. Large acreages formerly only adapted to grazing are now in use for grain production. Yield per acre is low and uncertain and the old implements did not permit a man to cultivate a sufficiently large acreage to subsist on. New machinery made it possible for the same man to plant a large multiple thereof. And so grazing land formerly only occupied by the stock breeder has now been added to the grainfields.

But all these alterations have not changed the principles of crop production. Different plants may be cultivated or plants may be grown where they were not before; simple implements may have been supplanted by more complicated machinery, thus enabling men to produce more in the same time, or to do the work more efficiently; the aim is the same; to bring the soil into such condition that the plants will thrive and to protect them against adverse conditions.

It has no influence on the growth of plants if the soil is brought into that condition by hoe, or spade, or plough; or if that plough is drawn by animals or tractor. Nor has it any influence on production if weeding is done by hand or by the use of implements or machinery. The only thing that matters is the condition of the soil and if man has succeeded in his endeavour to provide the best condition.

Every farmer knows by experience that yields diminish after his soil has been planted for a certain time with a crop or a succession of crops. This is put down to the soil and it is said that its fertility has diminished. Everywhere one tries to restore that fertility by one means or another. These measures to maintain the productivity of soil form an essential part of every system of agriculture.

We may say therefore that agricultural systems are characterised by:

- (a) the condition into which the soil is brought to produce a crop;
- (b) the method used to restore, maintain or improve its productivity.

(To be continued).

Notes.

GERMINATION OF OILPALM SEEDS IN SUMATRA. — In the *Bulletin économique de l'Indochine* of August 1930 a communication of the French Consul at Batavia is made on this subject. To establish a good seed bed a flat piece of land is covered with a layer of sand of about 5 cm. The seedbed should be exposed to full sunshine. The seeds from which the pulp has been removed are planted on the sand and covered with a new layer of sand of 3-4 cm. The planting should be done as soon as possible after harvesting the fruits.

The planted seedbeds are wetted once or twice a day to prevent them becoming dry. When it is not possible to plant the seeds immediately after harvesting it is recommended to keep them for two days in a solution of hydrochloric acid ($\frac{1}{30}$ acid and $\frac{29}{30}$ of water) and to wash them for two days in running water after this treatment.

The young plants must not stay for a long time in the seedbed as they will become yellow and shrivelled by lack of food and moisture.

EXCELLENT PAPER FROM RICE STRAW. — The same Bulletin publishes a letter from M. WELTER of the Department of Agriculture at Buitenzorg, Java, on paper. At Padalarang in Java a papermill was built during war time in which only papers of best qualities are produced. The most important material used for this purpose is rice straw. It must be observed however, that this straw only consists of the upper part of the stalk, only the straw of the ear and a few cm. of the upper end of the stalk being used. This may be the reason for the excellent results obtained.

It is possible in Java to get sufficient quantities of straw from the ricemills, as the Javanese harvest only the ears of the rice with a piece of straw of sufficient length to bundle the ears. The rest of the straw which is very coarse remains on the fields.

For some types of paper the rice straw cellulose is mixed with wood cellulose, but only in small quantities.

INCENSE FROM ITALIAN SOMALILAND. — The incense-tree forms part of the flora of northern Italian Somaliland, called Migiurtinia. The plant belongs to the family of the *Burseraceae*, and the genus *Boswellia*. There are two kinds which are distinguished as *Maidi* and *Beio*.

The *Maidi* lives in rocky places, where its roots may find some soil in cracks and holes. The stem is usually not higher than 3-4 meter, but in favourable conditions it may become as tall as 8-9 meter and in exceptional cases even stems of 20 meter have been found. The diameter may be more than 40 cm., and is covered by a brown reddish bark. The tree produces flowers in May and bears fruit in June.

The *Beio* prefers places with more earth; its bark is greenish coloured and is easily removed in pieces of a parchment-like appearance. It is generally smaller in size than the *Maidi*. Flowering and fruiting takes place at the same time as the *Maidi*.

The plants propagate themselves by seeds. It is believed that to acquire a good germination the seeds should pass through the intestinal canal of camels or goats, but there is nothing to sustain this opinion as very many plants grow in places inaccessible to these animals. Nothing is done by the natives to propagate these useful trees.

The incense is harvested by removing strips of bark of 4-8 cm. in length. The *Beio* forms globules of incense which harden on the tree; the *Maidi* does not form globules but lumps which are transparent. The wounds of the *Beio* may be renewed every fourteen days, those of the *Maidi* every twenty days. After a period of exploitation of five to six years the trees require a period of rest.

A normal tree of the *Maidi* variety gives per year about 18 kg., of the *Beio* species about 12 kg. of incense.

Exports from Italian Somaliland amounted to 2290 quintals in 1927; 6643 in 1928 and 9900 in 1929. Prices in Aden, from where most incense is exported to other countries amounted to from £3 to £5 per quintal, between 1924 and 1929. (*L'agricoltura Coloniale* 1930, No. 10).

RECOGNITION OF HEVEA CLONES. — The president of the "Algemeen Landbouw-syndicaat" of Java made the following statement to a session of this society according to the "Algemeen Landbouwwechblad". Dr. BOBILOFF of the Central Rubber Experi-

ment Station at Buitenzorg, Java, has discovered a new method for the recognition of Hevea clones, making use of the chemical reaction of the latex.

The latex from the stem of the leaves gives for every clone a quite distinct colour under influence of certain chemicals. Each clone is typified by its own colour, the intensity and the duration of the reaction.

More accurate information is not yet available.

JELUTONG PRODUCTION IN THE FAR EAST. — Jelutong is a product which is used as a substitute for chicle in the manufacture of chewing-gum. Chicle is the coagulated latex of the Sapodilla (*Achras sapota* L.), derived principally from Central America and commands a higher price than jelutong. The relative high cost of collecting chicle combined with the fact that supplies are rapidly diminishing as a result of destructive tapping methods, renders it probable, that the demand for jelutong will continue to increase.

Borneo jelutong is derived from *Dyera Lowii* Hk., a tree confined to swamps. In Malaya the product is derived from *Dyera costulata* Hk and *D. laxiflora* Hk, two species occurring chiefly on flat land and low hills at altitudes below 1500 feet. There does not appear to be any intrinsic difference in the jelutong of these three species.

Recent work on jelutong in the Straits Settlements has included an investigation of the keeping quality, in the course of which it was found that the creped refined jelutong after several months storage shows no increase in resin (acetone soluble) content. Since increase in resin content, popularly described as "oxidation" has been found to be due to the presence of iron salts, an investigation of methods of preventing such "oxidation" was carried out. The addition of sodium phosphate to jelutong latex containing iron salts was found to give good results.

A standard procedure for the determination of moisture, which is accepted by the buyers in New York and the Analytical Service at Singapore, has been developed.

It is estimated that in America, where the consumption of chewing gum is steadily increasing the markets are capable of absorbing about 5000 tons of jelutong annually. (*Journ. Agr. Malaya*).

SILT PITTING ON ESTATES IN RELATION TO MOSQUITO BREEDING AND MALARIA. — Since silt pitting became a widespread practice on rubber estates in the Malay Peninsula the larvae of dangerous mosquitoes, notably of *Anopheles maculatus*, have been found by many observers and frequently water is standing in silt pits both on hill sides and on comparatively flat land. The tendency for *A. maculatus* to breed in such pits undoubtedly becomes greater where other natural waters are regularly and efficiently oiled, the mosquito being thus driven to breed in what might not naturally be selected as a breeding place.

There is however no necessity for water to be held in catchment pits for any length of time; indeed it may be said that if the water remains for days at a time it is best from an agricultural, as well as from a medical point of view, that means should be taken for its quicker removal. If, therefore, the rate of percolation into the soil can not be sufficiently improved, the measures taken should be made to simulate the normal drainage of flat land.

Where on impermeable soils silt pits are necessary there is every reason that preventive measures against malaria (such as oiling) should be accepted as a standard practice, in hill drains and pits. This work will be largely of a seasonal nature. (*Journ. Agr. Malaya*).

STORAGE OF COCOA AT TROPICAL PORTS. — Investigations on the Gold Coast have showed, that humidity conditions in the interior are worse than at the coast. A long storage in a warehouse in the interior may cause an important loss in quality. At the Coast however humidity conditions are such, that a storage of 15 weeks does not damage quality. It is therefore very important that the beans after harvesting and drying should reach the harbour as soon as possible. (*Bull. Imp. Ind.* 1930, No. 4).

FIRE IN THE TROPICAL AND SUBTROPICAL GRASSLANDS OF AFRICA. — In South and East Africa the influences of the age-old practice of firing vegetation are of the first biological and economic importance. This question has been studied recently by F. J. V. PHILLIPS, but according to this scientist our scientific information requires considerable augmentation.

From the relatively small amount of intensive work that has been accomplished no matter what portion of the world is considered, it seems that firing, according to climatic, soil and vegetational conditions obtaining within a region, brings about changes of far-reaching consequence in the physical, chemical and biological conditions in soils.

In reviewing the state of our knowledge as to the influence of firing, it is held that neither those who state it to have no merits nor yet those who consider firing as having no evil effects are correct. Controlled firing is a useful and oftentimes necessary agent in veld management and in tsetse-fly control. It is urged that generalisations regarding the influences of firing should be made only after the local circumstances have been examined.

M. B. S.

AGRICULTURAL ENGINEERING.

Notes.

General.

AGRICULTURAL ENGINEERING BUREAU AT WASHINGTON. — Plans are definitely working out, at last, for the establishment at Washington of a Bureau of Agricultural Engineering. The work of the Bureau will be subdivided into six general classifications as follows: (1) Irrigation studies; (2) Investigation of design, construction and maintenance of drainage structures, (3) Studies of farm structures, (4) Studies of farm mechanical equipment, (5) Investigation of storage and transportation of perishable products, (6) Farm land development investigation.

To secure most effective co-ordination of effort, and to avoid overlapping of research work it is desirable that there be one recognised central clearing house devoted to the engineering phases. Forty of the State agricultural colleges now have established departments of agricultural engineering and the heads of almost all of these departments have expressed the belief that matters will be simplified for them when the government has an agricultural engineering annex. (*Farm Implement News*, Chicago 1931, No. 1, p. 18-19).

INTERNATIONAL AGRICULTURAL ENGINEERING COMMISSION. — A meeting of the Commission was held on 24 January 1931 at Paris in the Farm Machinery Exhibition Hall. The draft of the Statutes and Bye Laws of the Commission was approved. The headquarters of the Commission will be arranged at the next meeting.

The Commission proposes to study the formation of an International Centre for Agricultural Engineering, to coordinate the work and research of international interest and to start a Review of Agricultural Engineering.

The Commission includes 4 sections:— (1) Soil studies. Agricultural hydraulics. (2) Farm engineering work. Buildings. (3) Application of electricity to farming. Power farming. (4) Scientific organisation of farm work.

Construction of Farm Machinery.

THE MANUFACTURE OF AGRICULTURAL MACHINERY IN FRANCE. — In the machinery building industry that of agricultural machinery takes the third place, after motor cars and railway equipment. The number of firms making farm machinery has considerably increased since the war and now includes 15 employing 500-1000 hands, 25 employing 200-500, 125 employing 50-200, 480 employing 5-50, and about 500 small machinery builders. The number of persons employed in the manufacture of agricultural machinery in France may be estimated at 40,000; this number includes over 25,000 working in specialised factories employed by these firms.

In 1929 the number of appliances of all sorts made by the farm machinery industry in France was about 1,200,000, which represents an approximate weight of 320,000 tons, more than double that before the war.

The import and export figures for 1921 and 1925-28 are as follows:—

Year	Imports		Exports	
	Weight	Value	Weight	Value
1921	378 314 qx	106 723 000 fr	57 642 qx	25 929 000 fr
1925	381 902 »	151 574 000 »	144 305 »	59 452 000 »
1926	501 435 »	281 485 000 »	193 197 »	83 543 000 »
1927	278 380 »	142 496 000 »	169 182 »	78 977 000 »
1928	101 344 »	60 456 000 »	205 309 »	95 957 000 »

(From G. BRAUDET, in the *Journal d'Agriculture pratique*, Paris 1931, tome I, n° 3, p. 54-57).

Standardisation.

STANDARDISATION OF AGRICULTURAL MACHINES AND IMPLEMENTS IN DENMARK. — The rapid development of Danish agriculture is characterised among other things by the steadily increasing use of machines and farm implements. The efforts towards standardisation of such machinery of recent years in Germany and Sweden have led Denmark to establish a Standardisation Commission ("Dansk Standardiseringsraat") made up of representatives of the following industries and institutions: — Agricultural Associations, iron works, the machine trade, farm machinery manufacture, Agricultural Colleges, agricultural experts, Government Commission of Agricultural Machinery.

Engines.

THE DEVELOPMENT OF INTERNAL COMBUSTION ENGINES AND THEIR IMPORTANCE IN FARM MACHINES. — In a thesis for the doctorate presented to the Agricultural College at Berlin M. J. MATTONET gives a historical account of the development of the motor, describes its various forms and fuels. He then emphasizes its importance in farming and shows how it can be adapted to the conditions of practical agriculture. (MATTONET Julius, *Die geschichtliche Entwicklung des Verbrennungsmotors und seine Bedeutung als landwirtschaftliche Kraftmaschine*, Doktordissertation an der Landwirtschaftlichen Hochschule Berlin, November 1929, Mühlheim a. d. Ruhr, Druckerei J. Kopineck).

Harvesting Machines.

THE ADAPTATION OF THE HARVESTER-THRASHER TO EUROPEAN CONDITIONS. — In 1930 the International Harvester Company (U. S. A.) carried out trials in France of two different models of combines, one the usual model, the other smaller and still under experiment. The latter can be drawn by a 15-30 HP tractor and is worked direct from the engine. The cutter bar is 2.4 m. in width; its height is adjustable. The work was perfect from the point of view of reaping, thrashing and winnowing; the shaking was slightly inferior to that in the larger machine, perhaps because there is no system for adjusting the thrasher to a horizontal position on a slope. The crushed straw remains on the field, but may easily be collected by a Farmall Sweep Rake.

These trials show that the United States are actively concerned in solving the problem of the adaptation of the combine to the conditions of Central Europe. (*Journal d'Agriculture pratique*, Paris 1930, tome II, No. 11, pp. 293-297).

OHIO'S CORN HARVESTING FIELD DAY. — Ohio's first corn harvesting field day, sponsored by the Ohio State University, was held near Dola in Hardin County in the autumn of 1930. Prof. McCURN of the Department of Agricultural Engineering, Ohio State University, gave a preliminary report on some tests that had been made on the effect that seed bed preparation has had on corn crop yield. Prof. BARNES of the same University gave some interesting data relative to the cost of picking corn mechanically versus hand picking from the stalk. He pointed out that the operating cost on the two-row pickers were 40 % less than a single row. The greater portion of this saving is the saving in

labour costs. The average man-hours required to harvest corn in Ohio have been found to be for hand picking 9.8 man hours, for one-row pickers 3.75 man hours for two-row pickers 2.5 man hours.

It has been found by the actual tests that the corn picker is a very efficient machine as far as concerns getting the ears off the stalks. Practically the only ears missed are those which are lying on the ground. The amount of corn shelled is largely dependent upon the condition of the corn and the adjustments made by the operator; if a picker is properly operated, the losses are about 2 %, and if poorly operated they will leave as much as 6.8 % of the corn in the fields.

INTERNATIONAL COMPETITION FOR MACHINE HARVESTING AND FIELD THRASHING OF RICE, VERCELLI, ITALY, SEPTEMBER-OCTOBER 1931. — The mechanising of rice growing has made much progress but still has the large gap left by the lack of a mechanical harvester. In the United States special reapers and binders have been in use for some time, but the conditions there are different from those in Italy. In Italy the rice fields are smaller and the dykes more numerous; also lodging is more frequent owing to the heavier manuring given to the most productive varieties. For these reasons the American machines have not been of use in Italy up to the present.

In order to encourage research and the application of machinery which will make for real progress in the rice growing industry the *Stazione Sperimentale di Riscicoltura* at Vercelli is holding an international competition in 1931 for the mechanical harvesting and possibly field thrashing of rice. Three categories of machine can enter :— (1) simple reapers, (2) reaper-binders, (3) harvester-thrashers.

Firms and manufacturers of any nationality are eligible. (*Il Giornale di Riscicoltura*, Vercelli 1930, No. 12, pp. 181-184).

Grain Driers.

CONTRIBUTION TO THE STUDY OF GRAIN DRYING. — The United States Department of Agriculture has carried out grain drying investigations at Parshall, North Dakota. The importance of drying is increasing with the growing use of harvester-thrashers. By artificial drying grain which is too moist to reach the official standard can be reduced to the normal moisture content and so fetch a higher price. It has been shown that in 5 years from 6.2—56.8 % of the grain put on the market was over moist. A special importance is given to drying by the fact that grain containing many weed seeds, which are more moist than the grain itself, runs the risk of being spoilt if it is not dried within the required time.

There are at the present time 2 types of grain driers on the market; in one the heat is supplied by steam circulating in pipes, in the other combustion gases mixed with air are passed directly into the grain bins. At Parshall the second system was used in the form of a silo which dried about 82.5 quintals of grain per hour. The grain was carried to the top by an elevator while hot air was introduced below by a fan. The whole was then cooled to normal temperature by driving in cool air. The fans were each of 5 HP and were worked by electricity.

This work showed that the moisture content of wheat, barley, rye and buckwheat can be lowered by 20-14 % in one hour by heating to 71°C. The maximum temperature for drying without damaging the grain is said to be 82°C. Germination experiments showed that grain dried at 49°, 60° and 71°C respectively was unaltered. (*U. S. Department of Agriculture, Circular 127*, Washington, August 1930).

Transport.

TRANSPORT ON THE FARM. — Prof. FOEYISCH (Königsberg) has carried out a series of investigations on this subject, the results of which are published in the *Landwirtschaftliche Jahrbücher* (Berlin 1930, Band 72, Heft 6, pp. 835-952) under the title "Fördermengen und Förderwege in landwirtschaftlichen Betrieben". He shows (1) the importance of means of transport on the farm; (2) the frequent lack of organised transport, specially in and among the farm buildings — a more rational arrangement of the buildings would facilitate the necessary transport; (3) the great influence of a bad state of the roads and defective vehicles in increasing the necessary traction power and consequent costs of transport.

H. J. H.

ANIMAL HUSBANDRY

Efforts to obtain a more rational utilisation of horses.

A question which has been greatly debated in recent years in both the technical and the daily press — Horse or motor? — now seems to have been substantially solved; despite the extremely widespread use of the motor, the horse has lost none of its importance. The records of the International Congress of Agriculture at Bucarest (1929) clearly show the opinion of the principal technicians in this respect. In present economic conditions the horse still remains indispensable. Statistics of numbers of horses throughout the world, seem to show a gradual approach to stability and, if it is possible to talk of a crisis in horse raising, the latter is caused by the general economic situation being unfavourable to agriculture and perhaps particularly accentuated in the difficult and costly branch of livestock raising. The general report presented to the above-mentioned Congress by Mr. Prawochensky shows clearly that, in the countries which form typical examples of the rapid diffusion of the motor (United States, France and Germany), the horse and the motor are both considered to be important and necessary factors in economic life, the one being intended to supplement the other.

Even if the mechanisation of traction has not competed directly with horse raising, it has nevertheless had a decisive influence on its development. From statistics of solipeds, Prawochensky concludes, and with reason, that in the United States and in Europe the numbers of mules and asses are not below the pre-war level, but on the contrary, rise above it.

If it is considered that in the southern countries mules do the same work as horses in the northern countries, the above fact denotes a development of raising of solipeds analogous to that which has taken place in the northern countries. Despite the lack of general statistics concerning strains of horses, reports on horse raising in various countries and the changes which have occurred in the numbers of stallions, permit the conclusion that the crisis has affected raising of farm horses much less than that of light draught horses. Consequently, in countries cultivating intensively, raising of light draught horses at present tends to produce a rather heavy type, while the heavy draught horse industry retains its former characteristics.

According to Prawochensky, in the countries of eastern and northeastern Europe horse breeding is developing a little differently: the long distances, the state of communications, and above all the climatic conditions (long snowy winters), set certain limits to the development of the use of motors and this explains why in these countries, light, fast horses to-day remain predominant.

But, side by side with these facts explaining the development of horse breeding on the basis of the necessity of this animal in economic life, it is necessary not to pass over the difficulties which the raiser at present encounters and which he will again encounter in the comparatively near future. As it is involved in the general agricultural crisis and faced with the mechanical industry still in full progress of development, the horse breeding industry cannot maintain its position unless it devotes more attention to the quality than to the quantity of its products, or in other words, to the creation of different types corresponding best to economic requirements.

The supplanting of animal traction by mechanical traction will always be a question of economic convenience. This is why, in recent years, numerous comparative researches have been carried out with this point in view. Their results are very

contradictory, a fact which is hardly surprising, since the profitableness of animal traction depends on a host of factors. Calculations in this direction therefore, cannot definitely solve the problem but yet have a great advantage : the actual close comparison of cost and yield allows the exact recognition in the system of animal traction of the shortcomings to which previously little attention has been paid. It may therefore be said that the competition of mechanical traction has contributed to rendering animal traction more rational and consequently, more economic.

The Congress for the rational utilisation of horses which was held at Paris in 1927 (July 8th and 9th) marks a step forward in the efforts under discussion. Its agenda were : the economic conditions of horse raising, its relations to the mechanisation of traction by motor, the future and purposes of horse breeding in France, and the means of better utilisation of the horse. The resolutions of the Congress were that vehicles should be improved, thereby diminishing the effort of traction, that harness and manner of traction should be perfected by adopting elastic traction. The Congress also asked bridge and highway authorities to take into account the needs of horses when choosing road surface materials in order to avoid using those which might cause the horses to slip.

During the summer of 1927, on the demand of the Commission for the improvement of means of transport set up by the German Agricultural Society, the Institute of Agricultural Mechanics at Berlin undertook experiments with the object of studying (as was desired also by the Paris Congress) the resistance to traction of farm wagons. These experiments dealt with : load, size of wheels, speed, springs and form of axle-journals. The following points were also studied: influence of a larger or smaller angle of traction on tractive force, influence of a larger or smaller load resting on the front axle and on the back axle. Lastly, it was proposed to ascertain the economies in tractive force obtained by the use of roller bearings. The following is a summary of the principal results of these researches :

(1) *The influence of the diameter of the wheels and the width of felloes on the force of traction :—* On the field, the greater the diameter of the wheels, the smaller the saving in tractive force due to the width of the felloes. On the asphalt road, the latter had no influence on the resistance to traction.

(2) *The influence of the various forms of axle journals on the force of traction :—* None could be defined.

(3) *The influence of speed on the resistance to traction :—* A study was made of the influence on requirements of tractive force of speeds of 1.03 and 2.06 metres per second. — At the large tractive force needed for wheels size 800/80, the force required is nearly the same for both of these speeds. If the force needed is reduced by using larger wheels, double the speed (2.06 metres per second) requires only a small percentage of additional tractive force.

(4) *Influence of the springs on tractive force required :—* On soft ground (where ruts are easily formed), no saving of tractive force is obtained by resting the load on springs.

(5) *Influence of the distribution of load on tractive force required :—* On a straight track less tractive force is required even if the angle of traction varied, given that the front and back pairs of wheels exert the same pressure on the soil. On a curved track, a smaller front load only reduces resistance to traction by a small percentage. The best distribution of load is obtained when both pairs of wheels exert, as nearly as possible, the same pressure on the soil. In any case, the ¹ larger part of the load should not rest at the front.

(6) *The influence of angle of traction on tractive force required :—* When the traces made a positive angle (above the horizontal) of $19^{\circ} 30'$ with the horizontal, the force

needed was 4 % less than for horizontal traction and 12 % less than for traction at a *negative angle* (below the horizontal) of 23° . The optimum angle of traction was contained between $+12^{\circ}$ and $+20^{\circ}$; experiments made in the United States by Prof. King (Wisconsin) using an artificial horse showed that traction at an angle of $+20^{\circ}$ could develop twice as much force as horizontal traction.

(7) *The influence of the diameter of the wheels and the size of the felloes on the resistance to starting*:— On the field increased diameter of the wheels brought about a very considerable diminution of resistance to starting. On a concrete platform, on the contrary, its influence was negligible.

In following years Voelter continued these researches with the special object of determining the tractive force needed on five different soils. In all cases he confirmed that increase in the diameter of the wheels and in the width of the felloes diminished the force required; but the diminution obtained by the width of the felloes became less as the diameter of the wheels was increased. On these five soils, doubling of the width of the felloes gave such a notable saving in tractive force that Voelter advises that they should be given not less than 10 cm. width if the wagons are to transport heavy loads. By following the ruts in the track a further diminution may be obtained in the tractive force necessary. In fact, if the front and back wheels roll along the same ruts, the resistance to traction may, according to the type of soil and the size of the wheels, be 10-20 % smaller than if the two pairs of wheels each follow separate ruts.

Observations of actual traction show that the propulsion of a wagon is not smooth but jerky and this has led to the counteracting of jerks by introducing springs between the vehicle and the hub.

The experiments made by VOELTER on asphalted surfaces and on other pavings have shown that these springs do not reduce requirements of tractive force; but thanks to them the jerks are lessened.

Hub resistance forms an important part of resistance to traction. Comparing on the field the work of new axles having ordinary bearings with that of old axles, it has been found that for a load of 2000 kg. the former save up to 12 % of tractive force relative to the latter. According to Voelter, the axle-box should be of a form closed as well as possible to prevent the entrance of sand and dust which increase friction and consequently the resistance to traction, and also the wear of the bearings and axle journals.

The high price of roller bearings unfortunately prevents their widespread use in agricultural vehicles. The tendency is, however, to use them more as they greatly increase the work yield of draught animals. In Voelter's investigations, the use of these bearings in a wagon transporting a load of 2,500 kg. on a rutted track, gave a saving of 8 % in tractive force. On a track having a hard, smooth surface these bearings reduced resistance to traction by 35-40 %. Their great advantage consists in lowering the resistance to starting, which is so tiring to horses. In Voelter's investigations their use on the field for a load of 1800 kg. always reduced the force needed for starting by 19.5 % compared with the ordinary bearings. On a hard track, for any load, the reduction was 40-45 %.

Analogous results were obtained by a Swedish Military Commission entrusted with the task of ascertaining whether it would be advantageous to adopt roller bearings. In 1921 an artillery regiment covered 180 km. in 5 days.

To a wagon fitted with roller bearings 4 horses were harnessed; to another having ordinary bearings and carrying the same load six horses were attached. The physiological observations of the regimental veterinary surgeon showed that the horses of the first wagon were less fatigued than those of the second. From

the results obtained, the conclusion was drawn: that the use of roller bearings permitted a saving of about 65 % in tractive force on asphalted roads, about 5 % on stone metalled roads and about 40 % on good country roads. The tests concerning resistance to starting gave analogous results: in 8 successive startings, the fatigue of the 6 horses of the wagon fitted with ordinary bearings was 33 % larger than that of the 4 horses of the wagon having roller bearings.

The importance attributed to the diminution of resistance to starting from the point of view of its wearing effect on the horse is shown by the fact that English horse insurance companies reduce the amount of premiums payable for animals harnessed exclusively to wagons fitted with roller bearings.

Brief mention should be made of the experiments, not completed, of the "Reichskuratorium für Technik in der Landwirtschaft" (R. K. T. I.) with wagons having wheels with solid rubber tyres. These experiments seem to be very promising. It has been possible to put on these wagons a load two or three times as large as on ordinary wagons without overloading. These vehicles are especially advantageous on sandy country roads and in hilly areas: it remains to be seen how they will behave on very wet ground.

Summarising, it may be said that, by making some relatively simple technical alterations in the vehicles, much more might be done for the better and especially the more economic utilisation of horses.

Another line of action in this direction is the better combination of work effort of the animals used; it has been followed by the Horse Association of the United States and the multiple teams recommended by this association have given the best results to American farmers.

Since the introduction of tractors, the industry has set out to construct new agricultural machines having a larger work capacity than previous ones. Their advantages have been enormous, particularly because of their much smaller labour requirements relative to yield.

But, comparing the economic advantages of the use of tractors with those of the use of horses, it has often been found that the former were the more costly, consequently giving the preference to the latter even for drawing large agricultural machines; for this purpose teams of 4 or 6 horses are often employed and in the United States the number frequently reaches 18, 20 or even more.

Since the recent beginning of the use of multiple teams, technique has so developed that its practical utilisation to day appears to be fully justified. The Prussian Ministry of Agriculture, recognising the importance of the experiments carried out in the United States, has set up a commission charged with the study of the technique of these team systems and their application in Germany. Moreover, the Experimental Institute for the rationalisation of agricultural work (Pommritz, Saxony) and the German horse breeding associations (light draught and heavy draught) are also attempting to introduce multiple teams in practical agriculture. Finally, the Bavarian Ministry of Agriculture has recently instigated experiments on this subject.

The good results obtained with multiple teams have induced their use for drawing not only large agricultural machines but also several small machines combined. This permits not only a better utilisation of the machines already employed in agriculture, but also avoids the purchase of new machines. It is often advantageous to combine several similar machines or implements (rolls, harrows, cultivators, etc.), in such a way as to increase the extent of work done, or to combine several *different* machines so as to complete various kinds of work together (for example, cultivation and harrowing — sowing and harrowing — etc.). The driver of

the team often has a seat on the machine itself or if it is not possible to instal one (harrows, rolls, etc.) he sits on the seat of a small wagon attached, as he is therefore not obliged to follow the team all day long on foot, the driver can preserve his strength and do more work ; further, the speed of the team is increased, as it generally de-

Systems of multiple harnessing.

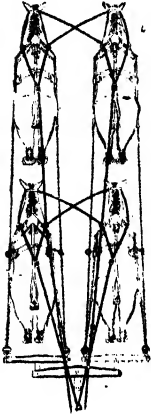


Fig. 1.

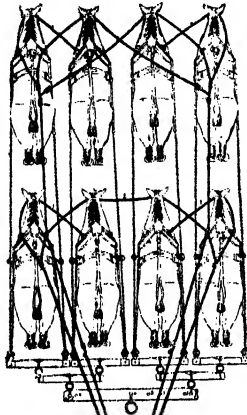


Fig. 2.

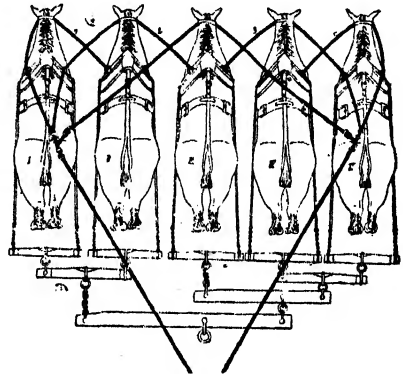


Fig. 3.

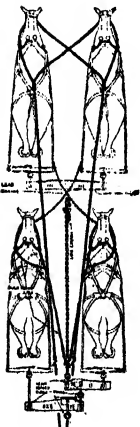


Fig. 4.

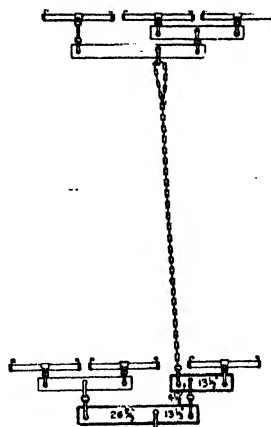


Fig. 5.

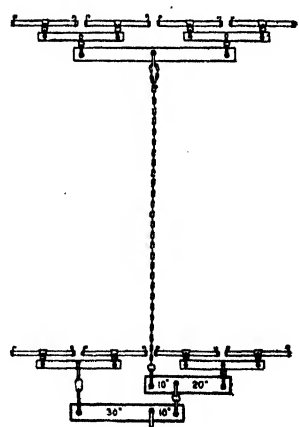


Fig. 6.

pend on that of the driver. If it is necessary to employ workmen it is also expedient to save them the fatigue of walking by providing a seat or at least a board fixed to the machine from which they can watch its functioning.

The multiple team may be guided by one man. By the present system, he has to guide not more than two horses ; the others are harnesssed in such a manner that they are obliged to follow the direction taken by these two. In the old American

system of guiding, the driver had to guide four horses as is shown in figures 1, 2 and 4. The method of guiding illustrated in figure 3 allowed the driver to guide only two horses but the numerous crossed reins caused too much complication.

At the present, the most simple systems of guiding, recognised as the best, are as follows :

(1) *Team arranged laterally* (figs. 10 and 11). — One of the outer reins is fastened to the right horse and the other to the left horse. The middle horses are guided by

Systems of multiple harnessing.

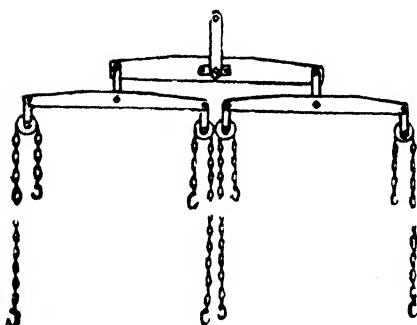


Fig. 7.

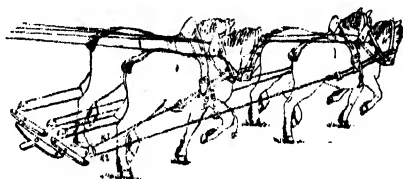


Fig. 8.

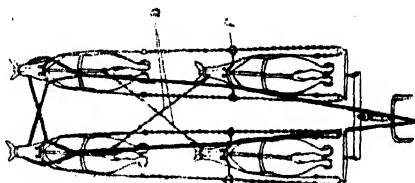


Fig. 9.

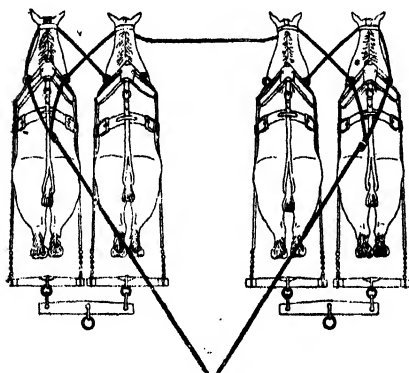


Fig. 10.

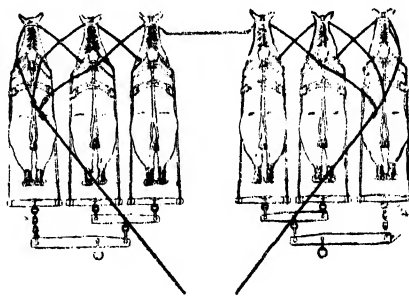


Fig. 11.

single transverse cords fastened to their bits. Crossed reins are avoided as far as possible.

(2) *Team arranged lengthways* (fig. 9). — There is a single long crossed rein for the front horses. The back horses are kept together by a short connecting rein ; if there is the possibility of their hanging back in turning, they are connected by reins or crossed cords to the traces, or still better, to the end links of the front horses. In this way, when the team turns, for example to the left, the right back horse is drawn towards the left by the left front horse, which at the same time pulls the left back horse.

The adoption of pulley swing bars (figs. 7, 8 and 9), recommended by Sack (Leipzig), has greatly simplified the old team system (figs. 4, 5 and 6). The front and back horses are connected by long traction chains running on pulleys fixed at the ends of the swing bars (figs. 1, 2, 7, 8 and 9). The work of all the draught animals is in this way equalised, a fact which is causing a great extension of the use of teams. Great advantage is obtained by removing the front swing bar if it hinders turning. In order that the long chain ends attached to the front horses for pulling the back swing bar do not become too great a hindrance when the team turns, they may be hung from the rein-rings fixed to the collars of the back horses (figs 8 and 9) to keep them at a certain height above the ground.

The multiple team has been tried out in nearly all the regions of large scale cultivation in the United States and Germany and has generally been a great success there. In Europe, it has a large importance, especially on average and large farms, its essential advantages consisting in diminishing the cost of production.

Among the numerous calculations made comparing cost and yield obtained, which naturally differ from one farm to another, there are given below only those made at the experimental farm of Radegast, belonging to the University of Halle (Germany) :

TABLE I. — *Ploughing for sowing to a depth of 18-22 cm.*

Plough	Width ploughed	Number of horses in team	Area ploughed per day
Single share, ordinary	30 cm.	2	0.4 — 0.5 ha
Two shares, with seat	60 — 70 "	4	1.1 — 1.25 "
Three shares, with seat	90 — 114 "	6	1.6 — 2.0 "

By doubling the number of horses in the team, the area ploughed per day was increased by about 120 %.

TABLE II. — *Cultivating.*

Cultivator	Width cultivated	Number of horses in team	Area cultivated per day
With flexible lines	1.3 m	2	1.5 -- 1.0 ha
" " "	2.0 "	4	4.0 — 4.5 "

TABLE III. — *Harrowing.*

Harrow	Width harrowed	Number of horses in team	Area harrowed per day
Ordinary, field	2 m	2	4 — 5 ha
»	4 »	4	10 — 11 »

Rolling and levelling have given the same results as harrowing.

TABLE IV. — *Stubble ploughing.*

Machine used	Width worked	Number of horses in team	Area stubble ploughed per day
Plough, three share	—	2 — 3	1.0 — 1.5 ha
Cultivator	2.0 m	4	4.0 — 4.5 »
Disk cultivator, double row of disks	2.0 — 2.3 m	5 — 6	4.0 — 6.6 »

TABLE V. — *Labour cost per hectare.*

Number of horses in team	Number of man-hours at 0.50 mark per hour	Cost per hectare
2	21.8	10.90 marks
4	8	4.20 »
6	2.5	4.70 »

All these data for the Radegast farm clearly show the economic advantage of the multiple team. This advantage is still larger if labour conditions are difficult. Moreover, the following advantages:— (1) horse traction permits the utilisation of feed produced on the farm and various unmerchtable products; (2) the cash expenses for repair of tractors, purchases of fuel, etc. are reduced; — (3) the depreciation of horses is much smaller than that of tractors — show that the multiple team may advantageously compete with the tractor and therefore open up great possibilities for the use of horses. It demands, above all, a more or less uniform team of horses of quiet and docile character, and this is a line to be followed in breeding and raising farm horses.

The efforts at rationalisation in the use of horses described above are not intended to mean that it is necessary to eliminate mechanical traction, which is evidently very useful under certain conditions, nor improvidently to increase the number of horses. The question is one of their better utilisation, in view of the fact that in contrast to motors the arable farm is in a position to maintain them from its own products, and of extending the basis for their economic employment.

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E. MOSKOVITS.

Notice.

XLth HUNGARIAN NATIONAL AGRICULTURAL EXHIBITION AND FAIR, BUDAPEST, 20-25 MARCH 1931. — The exhibition is being organised as in previous years by the Hungarian National Association and will include all branches of agriculture. The most important part, however, will as before be the breeding stock section, in which will be exhibited 200 horses, 760 cattle, 600 sheep, 1200 pigs and 1500 poultry of the best Hungarian stock. Foreign visitors will be granted large reductions in railway fares.

AGRICULTURAL INDUSTRIES

Present condition of industrial microbiological retting of textile plants.

The constantly increasing desire to discover textile plants which can satisfy the various industrial requirements necessitated by world progress induces agriculturists to welcome, in connection with this particular branch of cultivation, any effective means which will assist them in facing the difficulties of the present agricultural situation.

The International Institute of Agriculture pays constant attention and gives all encouragement in its power to the world movement for the cultivation of textile plants both on the technical and on the economic side and in addition, as regards the classical textile plants, flax and hemp, is constantly on the look-out for some means of defence against the competition of new-fangled and less valuable materials. In so doing it seeks to give effect to the resolutions and recommendations of recent congresses and international meetings, amongst which reference may here be made to the congresses of the Italian and Spanish hemp growers.

Retting has a specially marked influence on the quality and the cost of fibre production. The problem of industrial retting carried out by chemical and micro-

biological means, which is now replacing the older countryside methods, continues to be the subject of keen discussion and cannot be said to be as yet completely solved.

The present article proposes to discuss the industrial retting methods based on chemistry and biology such as are now most generally adopted and, later, reference will be made to the problem of the retting of textile plants which are not suitable for the ordinary industrial treatment on biological lines.

Before manufacture, textile fibres must be previously separated from the other parts of the plant through the elimination of the glutinous substances which unite them to each other and also to the neighbouring cells of a different type.

This result may be obtained either by purely mechanical means, chemically or by the use of microbes which destroy the glutinous substances, or by some combination of these various methods. These various processes may form part of ordinary rural practice or of the home industry of the agriculturist, or may be utilised on industrial lines, more or less extensive and more or less independent of the farm, both as regards methods followed and location.

Naturally, among the various methods followed and the various technical and economic aspects of the question, there are to be found in practice a number of combinations and variations which cannot be discussed in the limits of this article.

Hence this study will be limited to methods that are now actually adopted in purely industrial enterprises, i. e., which are in a position to carry out their function quite independently of seasonal changes and meteorological conditions, on which, on the other hand, similar work carried out in a rural environment is so closely dependent. Among these various methods those that are purely mechanical or chemical in character will be disregarded, although they are of special importance for certain textile plants such as, for example, the mechanical method of stripping practised on a large scale for several textile colonial plants, such as the alce and New Zealand flax, as also the green stripping of hemp which is frequently adopted in Italy, the chemical retting much used for ramie (grass-cloth plant) and the much discussed petrol retting method as applied to flax, which is known as the PEUFAILLET system.

The industrial methods, of which the principal is the use of micro-organisms, derive directly from the age-old systems of retting adopted in the countryside and, more particularly for flax and hemp, in which the microflora, the nature of which was long unknown, develops in the plant when wetted or plunged in water as the result of a certain degree of solar heat. In this form of retting the necessity for utilising this natural source of heat allies the process closely with the weather conditions; hence it can only be adopted at certain fixed times, often too short in duration or inconvenient because of their coincidence with other forms of farm work, while the process is liable to be impeded by any irregularity in the seasons producing varieties in temperature which are prejudicial to successful working.

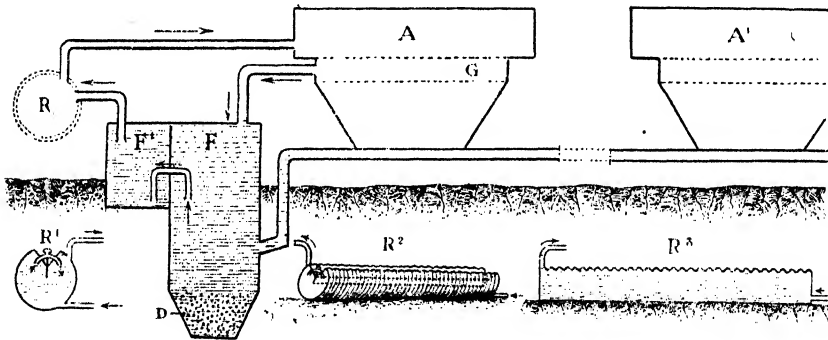
Moreover retting, as practised in country places, depends largely on the environment, including the nature of the soil and the nature and quality of the water, which are often not precisely suitable for the actual growing of the plant itself, thus causing waste of time and labour for transport from the field to the rettery and from the latter to the drying-ground and from the drying-ground to the peasant's home where the retted material is finished off.

These difficulties are aggravated by the fact that retting in rural conditions is often a thankless and difficult task; that the production of the fibre in such small quantities is an element making for lack of uniformity in the product additional to those elements which are inherent in rural retting methods, such as bundles un-

equally retted owing to distance from the surface and sides of the steeping tank, irregular distribution of the necessary microflora etc., and that frequently the economic situation of the country workers does not allow them to obtain the best price for the results of their work.

On the other hand, however, the markets have long been accustomed to fibre produced by the rural method and the machines in use are fitted to deal with this type of material. Hence industrial retting, if it is to be a practical success, must give a fibre which possesses technical and if possible obvious characteristics, similar to or, if possible, superior to that resulting from good examples of rustic retting methods. Among methods used in country places depending on microbic action, up to the present only those involving immersion in water have led to any form of

Universal retting tank with water circulating in a thermosiphon.



R = Thermosiphon. — R¹ R² R³ = Heating apparatus utilising solar heat. — F¹ F² = Tanks for purifying the water already used for retting. — D = Deposit of impure matter in the water.

industrialisation. In these the most simple forms substitute fuels for solar action and retting takes place in vessels arranged in covered out-houses with artificially heated water and, depends on the action of the micro-organisms naturally found on the plant's stalk, as is the case with the ordinary form of rural retting.

With such retting methods the further work required for separating the fibre is carried out in the establishment itself either by hand or by using automatic strippers and scutching machines of the most improved kind, finishing off with fibre cleansers.

Strictly speaking the different retting methods in which tepid water is used derive from the system originally recommended by SCHENK in 1847. Several improvements have since been recommended but have not often been adopted in practice and people who are in direct contact with the retting industry are aware that very frequently apparatus and machines of a more or less complicated order as recommended by inventors are to be found unused in a corner, while simple basins that can be easily warmed or filled with hot water are always more popular. As, however, some of these later improvements have survived and are still to be found in certain establishments, having shown themselves really effective and economic in working, they deserve a brief reference.

One of the questions to which inventors have devoted their special attention

is the proper retting temperature which in practice lies between the rather wide limits of 20° to 37°C . As a rule, retting processes which take place at a temperature near to the higher limit are the more rapid in their action but at the same time more difficult to control, while on the other hand those processes which are carried out at the lower temperature, though slower, are much more easily checked. In practice, the temperatures in most common use lie between 28° and 35°C . With certain processes the temperature is clearly indicated as for example in the COUSSINE process it is fixed at 25° , and at 33° in that known as the THELLIER-SOENENS.

The waste products of the textile plant itself are frequently used for the actual heating or in order to replace ordinary fuel. Recently it has been suggested and particularly in tropical countries to concentrate and store solar heat by means of special apparatus (STAMPA).

Another improvement in method consists in the continuous circulation of the water of the steeping-baths without introducing fresh supplies (COUSSINE and THELLIER-SOENENS methods); a certain degree of circulation is also produced under the systems which involve water heating by means of pipes fitted at the bottom of the baths. This development is important as it has the effect of making the retting operation more uniform; the process itself depends on certain specific micro-organisms naturally found on the plants themselves, and its thoroughness suffers to some extent through the irregular distribution of these microbes, a fact which has been clearly proved by the experimental work of CARBONE and other scientists.

Retting operations in which warm water is utilized have a further disadvantage, namely the accumulation of the by-products of the process itself, amongst which must be included the products of the decomposition, not only of the pectic substances, but also of all the soluble and solubilized elements in the plant itself.

Some of these by-products are merely toxic for the microbes on whose action the retting depends; others are also evil smelling or poisonous to the fauna of the streams into which the retting efflux is drained or affect the colour or other qualities of the fibre or else are noxious in other ways.

The improvements introduced into the whole group of industrial rettings are intended to eliminate this drawback and may be divided into three groups:

1. Chemical neutralisation of the harmful products: several methods have been proposed in this connection, but without success, on account of their high cost; they are in particular directed to neutralising organic acids by means of substances directly or indirectly alkalisising (calcium carbonate, urea, etc.).

2. Mechanical separation of these products, as well as substances which bring about their formation; for this purpose the textile plant is soaked for some hours in warm water before its final immersion in the retting water; this method effectively counteracts the formation of fetid substances, but is not free from disadvantages in practice. The elimination of toxic substances already formed is secured on the other hand when the water is replaced later on, when decomposition has begun. This results in a more rapid retting, with a less unpleasant odour, and yields a cleaner fibre. In practice these two processes are one and the same, the only difference between them consisting in the longer or shorter period before the renewal of the water. These processes are actually employed both in the method of STEENKISTE and LEGRAND, which is followed in a somewhat theoretic way in Belgium, but said to be practically applied in Russia, and in the German processes. These latter began during the war with the retting in a channel with a current of warm water, and have been carried on by arranging for the partial renewal of the water, after periods of varying length, in the vats of the large retting establishments of Germany.

3. Purification of the water in the retting tank by aeration, after which it is

passed back into the vats. The inventors credit this aeration also with encouraging the development of the aerobic micro-organisms of retting; but in reality this result is not always obtained, nor is it desirable. The Rossi method might be classed in this group, if it were applied without the addition of microbial cultures, which is possible if there is reason to suppose that the plant is already provided with the aerobic micro-organisms useful in retting. In this case the aeration continues or operates intermittently with compressed air, by means of pipes pierced with holes arranged at the lower part of the vats. On the other hand, in the German OCHMANN method, the water is aerated by making it fall in a shower, and in the THELLIER-SOENENS method, the water is pumped into the bottom of the vat and returns from above, being aerated in its transit by the fine bubbles that are obtained by compressing the air between the walls of a porcelain cylinder or one of porous sandstone. This aeration and the fact of maintaining the temperature at 33°C form the bases of the retting according to the THELLIER-SOENENS method, which is the most modern system of *industrial retting of flax* and is applied in Belgium and Spain.

M. CARBONE adds in this connection that in July 1930, in the classic region of flax cultivation at Courtrai (Belgium) he was able to ascertain that several establishments had, even at that date, given up the use of the aeration apparatus or had simply kept the pump, utilising it to increase the temperature of the water during its passage through the pipes, with a view to the re-establishment of the temperature of the water in the retting tank or of increasing it gradually. He further remarked that the retters used the pump to carry out the aeration by the water shower, thus linking this method with that of OCHMANN.

The aeration of the textile in retting is also secured, in the FEUILLETTE process, by taking the textile plant temporarily out of the bath and turning it over. A similar effect (and probably others as well) is produced by the double retting practised in Belgium, *viz.* the process of taking the flax out of the tank at the end of a certain time, drying it and retting it a second time in the renewed water.

It would be difficult to say whether in industrial practice, the regeneration of water by pasteurisation has ever been tried. By following this method M. CARBONE was able to make, in the laboratory, 17 successive rettings of hemp bark in the same water.

An improvement of some interest consists in preparing a kind of ferment by infusing the scutching residues for from 6 to 24 hours in water at 30°, as shown in the process COUSINNE (retting at 25° with circulation of water from below upwards) in France. This is a trial of a preliminary culture of the retting flora which is afterwards sown in the tank.

This last process establishes a transition to a second group of retting methods where the textile plant on immersion in water of the proper temperature is sprinkled with cultures of retting microbes or with ferments which are full of these micro-organisms prepared with the material which has been sown with pure cultures. Taking it all round, the technique of this method does not differ from that of the previous group, except that in this case, the temperature, the aeration and other operations are regulated so as to be as nearly as possible the optima conditions for the micro-organism which has been sown, the object being to encourage its growth in comparison with the other retting flora. All these methods are in fact applied in practice in the conditions of *pure natural culture*, as retting by pure culture, with previous sterilisation of the plant and the steeping water, although technically possible is not in practice a convenient method.

The microorganisms suggested for this group of retting methods may be subdivided as follows:

1. *Aerobes.*

(a) Group of *B. subtilis* and *mesentericus* (*B. mesentericus vulgatus*, investigated for the purpose by VIGNAL — *B.* of MARMIER = *B. pecticus* and others of the same type of ROSSI — *B.* of RUSCHMANN — *B.* TRAVETHICK, ROBINSON and SNYDER);

(b) Group of *B. asterosporus* (*B. asterosporus* Mayer Migula — *B. macerans* Schardinger — *B. Cosmesii* Rossi — *B. Kramerii* Rossi and Carbone — *Bacillus* β of MAKRINOV and CIGIOVA — *Pectinobacter amylophilum* Makrinov).

2. *Anaerobes under certain circumstances and less strictly anaerobic.*

These organisms even if capable of more or less aerobic life are usually active for retting in anaerobic conditions. They include a number of species and varieties belonging to the group of *Bacillus Amylobacter* in the sense of BREDEMANN (*Granulobacter pectinovorum* and *Granulobacter urocephalum* of BEIJERINCK and VAN DELDEN — *Plectridium pectinovorum* of STOERMER, *bacillus* de WINOGRADSKY) the bacteria 1, 2, 3, 4, 5, and the bacillus 6 of KAYSER and DELAVAL.

3. *Strictly anaerobic.* — This group includes for the moment only the *Bacillus felsineus* Carbone, the *B. Maymonei* Carbone, and probably *Plectridium amarillum* Sordelli and Soriano, of which it is merely known that it does not attack cellulose, that it produces a less energetic retting than that of *Bacillus felsineus*, and that it imparts to mashed potatoes a bright yellow coloration.

4. *Thermophilous retting organisms* still unknown, but probably active in the simple country retting of textile plants such as is carried out in the hot springs of Bulicane at Viterbo in Italy. It would be of interest to isolate these organisms, as it would make it possible to obtain, by means of the high temperature of the retting, conditions practically similar to those of retting with a really pure culture (STAMPA).

Each of these different groups of microbes (and even, in part, each of these species) of course confers on the product, that is the fibre, special characteristics. Thus the aerobes produce the false retting, very different from the true retting of the Italian country retting tanks (CARBONE), the *Amylobacters* are capable only of producing a poor and uncertain effect; the strict anaerobes, and in particular *B. felsineus*, act uniformly and actively, and impart to the fibre the characteristics of the best country retting methods carried out under water.

In actual practice, it is not possible to speak of amylobacterial industrial retting, as that is now a matter of history, mainly as regards the DOUMER and DESWARTE processes. The aerobes (*Bacillus Cosmesii*) remain with the ROSSI process, and the anaerobes (group of *B. felsineus*) with the CARBONE method.

The ROSSI method (Portici) was widely applied in industry at least up to 1922, and in particular by the factories of nine localities in France and Great Britain.

This process has been applied for hemp, both in the stalk or stripped green, flax and ramie, and laboratory trials show that it may be utilised for several other textile plants. The material to be retted is placed in vats with pipes inserted below which for aeration purposes are pierced with holes; it is immersed in water heated to 28 to 32°C. to which is added a ferment obtained by cultivating, in a decoction of the plant, the pure culture supplied by the inventor. This temperature is maintained during the whole of the operation, and air is introduced either continuously or at least for 10 hours out of the 24. That the object of obtaining the preponderant action of the aerobes is really achieved is shown by the fact that the fibre presents the features of "false retting".

The practical application of retting by means of *Bacillus felsineus* is less diffused

topographically, but is making progress. This micro-organism which was discovered in 1916-17 as active in the country retting of hemp, and was later confirmed as also present in the case of flax in several regions of Italy and other countries, is considered as a distinct species both from *Bacillus Amylobacter*, and from the numerous series of the aerobic retters which may be called "false retters". It resembles *B. Amylobacter*, being like it anaerobic, and also like it in various morphological characteristics, but it is distinguished both by several biological features and also by the fact that the retting properties which in *felsineus* are intense and uniform are on the other hand weak and unstable even in those varieties of *Amylobacter* that possess them.

M. CARBONE is of opinion that this bacillus does not at all resemble the "false retters" (*Bacillus asterosporus*, *B. Comesii*, etc.) which are aerobic and completely different from *felsineus*, both in all morphological and cultural characteristics, and in the type of retting produced which imparts to the fibre characters quite different from those of retting properly so-called. Thanks to the discovery and isolation of the agent in the under-water country retting, it has been possible to find a method of industrial retting based on the processes of an ordinary retting in warm water, with addition of an abundant, fresh and active culture of *Bacillus felsineus*.

As the result of this addition, retting begins at the same time and with the same intensity at all points of the mass to be retted. This effect is not produced in simple retting with warm water, because of the irregular distribution of the retting microbes which very often but not always are naturally found on the stalks of the textile plants.

The cultures of the bacillus necessary for this method of retting are prepared by the "Istituto Sieroterapico Milanese" and are on sale either in the liquid form of "Felsinozima", or in powder "Felsinozima secco". The dry Felsinozima is 10 times more concentrated than the liquid Felsinozima, more easily transportable, especially to great distances, and has better keeping properties; it can better resist the crossing of the Equator and hot climates.

In the factory, the Felsinozima, either liquid or dry, is placed in the containers which have in them warm water and 20 % of raw potatoes cut into pieces. This mixture is kept at 37°C. during the two or three days necessary for the decomposition of the potatoes (ferment). To prepare 10 litres of this ferment, half a litre of liquid Felsinozima is used or 50 grammes of the powder.

This ferment is added, in the proportion of from 3 to 10 litres per quintal of textile plant, to warm water in which the plant has been placed for retting. During the whole time of the operation the temperature must be maintained between 25 to 28° and 37-38°C. By regulating the quantities of ferment, the temperature and the length of the time taken for the retting, the process can be controlled according to the textile plant treated and the required product.

The above retting method has given good results with the various plants shown, as follows both in the laboratory and in trials extended to some tens to hundreds of kilogrammes of textile plants:

Agave americanus
A. candelabrum
A. yuccaeifolia
A. Rumphii
A. sisalana
A. zapupe
Althea cannabina
Althea officinalis
Asclepias Cornuti

Hemp of different regions of Italy, Germany (Bavaria) and Spain (Alicante)
 Carao of Brazil (*Neoglaziovia variata*)
Crotalaria sp.
Fourcroya altissima
Fourcroya gigantea
 Mulberry of different parts of Italy and variously prepared
 Brooms (*Spartium junceum* and *Sarcotamus scoparius*) of different parts of Italy

Girardinia condensata
Gomphocarpus fruticosus
Grewia oppositifolia
G. orientalis
Hibiscus roseus
Jucca gloriosa
 Russian kenaf (*Hibiscus cannabinus*)
 Flax of different varieties coming from
 different parts of Italy, Germany, Ar-
 gentina, Cape Colony and Tripolitania
 Mallow
 Manioc or cassava, for the extraction of
 starch
 Nettle
 "Palo de escoba" from Ecuador (*Sida*
 sp. probably *rhombifolia*)
 Potato: tubers of various origin, for
 extraction of starch and the prepara-
 tion of ferments

Phormium sp. from Argentina.
 Ramie of different varieties, of Euro-
 pean origin (Italy and France) and
 Chinese, prepared in different ways,
 (including various types of China-grass)
 both by hand and by machinery
 Castor oil plant.
Sansevieria cylindrica
Sansevieria of Further Jubaland
Sansevieria Zeylanica
Sida Avicennae
 Esparto grass (*Lygeum Spartum*) (The
 retting is much more successful after
 previous boiling with carbonate of soda
 at 1 % or similar treatment)
Sphaeralcea angustifolia
Theobroma cacao
 Jerusalem artichoke
 "Tucum" (Brazil palm)

Attempts have also been made to ret the bark of willows and the leaves of *Dasy-
 lirion glaucophyllum*.

It was shown that the following were not susceptible of attack by *B. jelsineus* :
 the main stems and branches of the cotton plant, the fruit-bearing stalk of the date
 palm, the leaves of *Chamaecrops humilis*, of *Gyncrium argenteum* and of *Washing-
 tonia filifera*, and also *Stipa tenacissima* which is often confused with the true esparto
 grass or *Lygeum spartum* mentioned above.

In Italy the only type of artificial retting employed is that practised with *B.
 jelsineus*, in addition, of course, to the traditional country retting in water which,
 according to M. CARBONE, is possibly due to the same bacillus. Two firms at present
 are engaged in this operation : that of M. TURLINI (whose establishment, an industrial
 one in the true sense, is at Bassano Bresciano, and that of the "Lavorazione Indus-
 triale della Ginestra (L. I. G.)" belonging to Achille Trinca Armato and Company,
 who have a semi-experimental establishment at Nocera Umbra. In addition there has
 been lately founded a Spanish Limited Company of "Retting Textiles" which has
 not yet begun working.

The Bassano Bresciano establishment has been at work since 1922 and usually
 deals with flax, but it has already engaged with success in the industrial retting of
 hemp and ramie. This establishment has successfully tackled the complicated prob-
 lem of flax in Italy (1925) of the sowing for obtaining fibre, of the employment of
 the seeds and the utilisation of the residues, at a moment when flax cultivation
 in Italy was nearly at its ebbspoint owing to the shortage of fibre, its poor quality
 and the competition of foreign seeds. In 1930, on the other hand, the firm had to
 refuse a large number of orders for spring linseed at high yield so as to avoid over-
 bookings. As regards quality of the product, the retting and the subsequent treat-
 ments have been improved. The fibre obtained is remarkable for its uniformity
 and has been pronounced satisfactory by Italian and foreign experts.

The establishment of Bassano Bresciano is, taken as a whole, similar to the
 German retting plants, both as to the number of vats, and as to the installations used
 for the mechanical treatment of the retting material ; retting by means of *B. jelsi-
 neus* would appear however to be equally well practised in less important establish-
 ments, such as those which originally put into practice the ideas of VAN STEENKISTE
 and LEGRAND and those which practise retting in warm water in Belgium, of which
 there are a large number at the present time.

The establishment of the L.I.G. was founded in 1926 for the retting of brooms. This operation was designed not only to supply to the textile industries a fibre already well known for its good qualities but not employed in practice, but also to encourage the cultivation of lands which do not carry other crops. There is much land of this kind in the mountain regions of Central and Southern Italy and in the Islands, as well as in the regions where the broom plant flourishes of several other countries of the Old World (the Mediterranean countries from Portugal to Asia Minor) and of the New World, such as California, Mexico, Peru, Bolivia, Chili. With this object, the Company has made a study of the best methods of growing and gathering, of the preliminary treatment, the cleaning of the retted fibre and its subsequent utilisation, all points difficult to ascertain as bearing on a completely new industry. The output of the Company is still small, not amounting to more than ten quintals of stalks per day, which keeps the cost of production high.

The treatment of Spanish broom (*Spartium junceum*) taking old plants but using by preference the one or two-year old branches, includes the following operations :

1. Gathering and drying in the sun on the spot. Gathering goes on during the whole period between the fall of the blossom (July) and the subsequent germination of seeds (March-April). During the drying the stalks lose 50 per cent. of their weight.

2. Storage : the dry material can be used immediately or even after two years.

3. Crushing by machinery.

4. Retting by means of *B. felsenus* (10 litres of ferment per quintal of stalks) ; this goes on for three or four days.

5. Washing under pressure, then pressing.

6. Drying, in the sun, or in desiccators.

7. Mechanical isolation of the fibres by means of wooden implements (carding, scutching, stripping).

All these operations beginning from the crushing take at present from six to seven days, and as the establishment has five vats of 39 m³ capacity each (capable of holding about 10 quintals of stalks) the work can go on continuously.

Industrial yield. — From 100 kg. of dry stalks from 15 to 16 kg. of stripped fibre is obtained, equivalent to from 10 to 11 kg. of carded fibre, *plus* 10 kg. of residues and 35-40 kg. of stalks. The part unaccounted for consists of the retting losses, the woody residues and dust. The fibre may be utilised in three different ways : as stuffing ; as textile material for string, cord and sacking ; and for the manufacture of paper. It may also be mixed with wool or cotton for weaving. The residues are employed in paper factories ; the woody stalks which have a calorific power of 4770 calories are burnt in the factory and thus effect an economy of 50 % of the fuel for the heating apparatus, which is however not yet of a fully improved type.

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It will be seen from the above statement that the methods of microbiological industrial retting practised at the present time are the SCHENK method and others derived from it but not always easily definable. Among these preference is now given to those involving the use of water more or less renewed or circulating, sometimes regenerated by aeration (method of THELLIER-SOENENS) ; other methods involve addition of a culture, especially the present CARBONE method (I. S. M.).

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G. STAMPA.

BOOK REVIEWS

Tropical Crops.

Extension intensive et rationnelle des cultures indigènes. Enquête Résultats. — Bibliothèque Coloniale Internationale. Institut Colonial International, Bruxelles 1929.

[In the programme of the session of the International Colonial Institute, which should have been held in Brussels in 1923 the following subject appeared: "Development of native cultivation in tropical colonies, especially as regards the African colonies", in which M. DE WILDEMAN submitted some proposals. This question was discussed at Rome in 1924. The Institute considering that a further examination of these problems was warranted again included them in the agenda of the following session, which was held at The Hague in 1927. M. DE WILDEMAN wrote a further report and as a result of further consideration the Institute, with a desire to work on an entirely scientific basis, decided to make a thorough investigation.

An enquiry was organised the essential aim of which was to make known the true importance of native agriculture as carried out by the natives for their own benefit in various tropical colonies, Asiatic as well as African, the endeavours which have been made to develop this work, the means employed to this effect, the results obtained and also the disadvantages of this manner of colonisation. A questionnaire to be used for this enquiry was sent to all colonial governments to point out on which questions information was specially wanted.

This questionnaire was answered by all the governments of the French, British Italian and Belgian Colonies in Africa, of the Portuguese colony of Angola. From Asia the questionnaire was answered by Burma, Ceylon, Indo-China and the Philippine Islands. The government of the Netherlands Indies sent a memorandum which did not correspond exactly with the questionnaire, for the reason that the questionnaire did not correspond with conditions in the Dutch colonies.

It is by this collaboration of almost all colonial governments that a valuable source of information has been built up with regard to native agriculture in the African and Asiatic colonies. This publication of the International Colonial Institute is therefore indispensable for everyone who desires reliable information on this subject].

Les kapokiers et leurs succédanés. Culture et exploitation. — Société de Propagande Coloniale, Bulletin Nos 1 à 6 (janvier-juillet 1927). Publication de la Section spéciale des Cultures Coloniales. Paris, Avenue Trudaine, 45.

[The writer groups the kapok trees and their substitutes as follows:— (1) Plants producing kapok, which is found in the fruit surrounding the seeds; (2) plants producing vegetable silk, which is attached to the seeds; (3) plants producing vegetable hair, which grows on various parts of the plant.

Kapok 'silk-cotton' has been known in Europe since 1850 when it was imported in small quantities by the Dutch. After the Paris Exhibition of 1899 the fibre began to be known and trade in it developed till it reached two or even three times its present importance, for now the genuine kapok has given place to various imitations.

The fibre obtained from the following genera can be called real kapok — *Eriodendron*, *Bombax*, *Chorisia*, *Ochroma*, *Cochlospermum*, *Kleineria* and *Ipomaea*.

The best Javanese kapok comes only from *Eriodendron anfractuosum*. The writer discusses the species of *Eriodendron*, *Bombax*, etc. botanically and describes the properties of the seeds and of the oils that can be extracted from them.

The most important centre of the cultivation of kapok is now the Netherlands Indies, Java in particular. About 1900 an expedition was sent from the Philippines to Java to study its cultivation and take back seed. In Indochina the genus *Bombax* occurs mainly; in Cambodia *Eriodendron anfractuosum* also grows but the fibre is less elastic than that grown in Java and is of a darker colour. *Eriodendron* grows also in Madagascar and Ceylon, but there also the fibre is inferior to that of Java. In British India it also grows and is used locally.

Kapok is produced in French West Africa by *Bombax buonopozense*. Its cultivation is organised and the production increased from 50 tons in 1911 to 200 tons in 1926. The natives cut down the trees to exploit the fibre. In British West Africa there are large stands of *Eriodendron* in the forests which are to be exploited by natives.

The cultivation of *Eriodendron* has been undertaken in Tanganyika since before the war. In 1912 2630 hectares were planted with it. Unfortunately it harbours pests which also attack cotton.

Eriodendron grows in nearly all the British West Indian Islands, particularly in the Bahamas, but the trees are scattered which makes picking difficult. There is no desire to develop its cultivation there also on account of cotton pests.

In Mexico and Venezuela kapok trees exist in large numbers but the species is not known to the writer.

Cultivation and exploitation. — Details are given concerning climate, soil, propagation, inter-cropping, planting, picking, yield, preparation of the fibre and marketing. The characteristics and uses of the fibre are also described. The greater part is used for stuffing bedding and making life-buoys. The latter use is due to the particular capacity of kapok for floating on water; it can support from 30 to 35 times its own weight, whereas cork can support only 5 times its weight; this capacity is little changed by prolonged immersion because the fibre does not absorb moisture. It dries readily, does not ferment and does not retain unpleasant odours. It has been used of late for making quilts. Dr. SELHOJ states that dressings made of kapok are twice as light as those of cotton, are supple, warm and very soft.

The fibre does not admit of spinning. In Germany in 1914 a cloth was put on the market supposed to be made of kapok but was really of 'akon', a fibre resembling kapok and produced by *Calotrohis gigantea*. There is no need to endeavour to find fresh outlets for kapok. The vegetable silks and hairs have entirely different characteristics].

Les Hibiscus. Culture et exploitation. — Société de Propagande coloniale, Bulletin Nos 3 à 6 (mai-juillet 1928). Publication de la Section spéciale des Cultures Coloniales. Paris, 45 Avenue Trudaine, Prix 15 fr.

In the author's preface it is pointed out that the supplies of jute come entirely from British India and that its consumption has increased more rapidly than its production. Endeavours to introduce its cultivation into other tropical countries have so far failed, because jute is exacting in climatic requirements and moreover needs particular economic conditions, such as abundance of cheap labour, retting facilities and the absence of more remunerative crops. A solution of the problem has been sought among possible substitutes and a number of species of *Hibiscus* have been found highly promising.

Part I gives an exhaustive study of the genus *Hibiscus* indicating the useful characteristics of each species and its diseases and pests.

Part II deals with the geographic distribution of the genus and its utilisation throughout the world. Two species in particular seem to be of value as fibre plants:— *H. Cannabinus* and *H. Sabdariffa*.

Part III deals with the experiments already made in cultivating *Hibiscus* and the conditions of climate, soil and culture required.

Part IV describes the methods of extracting the fibre and its characteristics. One of the interesting points discussed by the writer is concerned with the estimation of yield.

He says that it is essential to develop a rational method and that the only rational method consists in cutting the crop, spreading out the stems with their leaves and calculating the area they cover; if it is a field crop several samples of 5 metres square can be taken from different parts; the percentage of leaves can be determined by stripping a few stems after weighing; then all the stems, stripped of their leaves or not, will have the bark removed by hand or by machine; the bark will be weighed moist or dry, but preferably dry; the percentage of bark can then be deduced. The bark will then be treated for extraction of the fibre and the real percentage of fibre in the stems with or without leaves will be obtained].

M. B. S.

HOWES H., *Management of Farm Poultry with a View to Profit*. Chapman and Hall, London, 1930, 180 pp., 68 ill.

[This extremely useful and practical book is intended more for the general farmer who wishes to make poultry a profitable sideline than for the specialist poultry farmer. The writer has for 30 years been connected with the development of the poultry industry as a branch of British agriculture. He is thus particularly fitted to show how the farmer can improve his present position by the application of good management and business organisation to the keeping of poultry on the farm.

Chapters are included under the following headings:— systems of poultry keeping (intensive, free range, etc.), housing, selection of breeds for egg production, foods and feeding, natural and artificial incubation, natural and artificial rearing, table poultry production, selection and culling, breeding and rearing turkeys, water fowl production, marketing of produce, diseases and their prevention. Each subject is treated from a practical business standpoint and the most up-to-date information given.

Another chapter discusses fully the comparative initial costs of hatching eggs, day-old chicks, 3-months-old pullets, 6-months-old pullets and one-year-old hens. The 3-months-old pullets are found to be the most economic proposition, as with them the expense of incubators and brooders is postponed until these pullets are producing. A sample balance sheet is given for the first 4 years, showing that up to the end of the 3rd year any profits are used in the provision of further stock, housing and appliances. During the 4th year receipts and expenditure reach sums which represent approximately the income and outlay to be expected in subsequent years].

A. M. F.

Industries.

Federazione Nazionale Fascista Industrie chimiche ed affini, Annuario 1930-VIII. Roma, 1930, 1204+3+51 p.

[This Yearbook contains the names and addresses of the firms belonging to the chemical industries groups formed by the three Italian Fascist Federations: Chemical and Allied Industries, Agricultural Chemical Products Industry and Artificial Textile Fibres Industry. It is the first yearbook of this type to be produced by the Industrial Organisations. It includes 2841 firms belonging to the first Federation, 103 belonging to the second and 33 to the third.

The section dealing with chemical industries exclusive of artificial silk is subdivided as follows:—

Part I — Alphabetical list of firms with information about each.

Part II. — List of the firms showing their Communal, Provincial and regional distribution.

Part III. — Alphabetical list of the products with the firms producing them.

Part IV. — Foreign markets.

The volume contains also notes on the Italian chemical industry and the export of the products, and a complete index to the contents.

The appendix dealing with the Fascist Federation of Producers of Artificial Textile Fibres contains notes on the artificial silk industry, an alphabetical list of manufacturing firms, list of the firms showing their Provincial distribution, list of the various types of product, list of foreign markets, statistics].

FORESTRY

Progress in the technique of tapping.

The use of resinous products, thanks to the rapid technical progress made in the industry utilising them, has achieved a considerable development. The need for such products is increasing day by day and the producing countries are becoming constantly less capable of satisfying the growing requirements: this production has considerably diminished notably in America, which is the principal producing country. It is for this reason that the forestry research stations in different countries are intensifying their studies on the various methods of tapping pines. The results of this research are very important from the scientific and practical points of view.

But, before examining the results of these researches it is opportune to consider the average annual production of rosin during the last few years in the principal producing countries. The United States furnishes 60-65 % of the total world production or, in round figures, 350,000 to 420,000 metric tons of dry products (colophony, rosin, etc.) and 98,000 metric tons of oil. France holds the second place with 100,000 metric tons of dry products and 25,000 metric tons of oil, representing about 20 % of the total production. Spain follows with 10,000 metric tons of the two products. Among the countries producing smaller quantities we have not mentioned Austria, producing an annual total of 4,000 to 4,400 metric tons.

With reference to the consumption of the products of rosin, the United States also heads the list with 35-40 % of the world consumption.

The most important resinous varieties for tapping, according to the classification of Mr. Wolff (Berlin), are as follows : in America, *Abies balsamea*, *Pinus Strobus*, *P. resinosa*, *P. taeda* and *P. palustris* ; in Europe and Africa, the *Pinus maritima* (France, Spain, Portugal and Algeria) is the most important but mention must also be made of : *Picea excelsa*, *Abies pectinata*, *Pinus sylvestris*, *P. Cembra* (in the Carpathians), *P. halepensis* (France), *P. Laricio Corsicana* (Corsica), *P. Laricio austriaca* (Austria and France) ; in Asia : *Pinus khasyana*, *P. Merkusii*, *P. orientalis*, Link, *P. longifolia* Roxb.

An examination may now be made of the results of the experiments undertaken by the research stations (especially the French one). Their object is : the study of variations in yield according to the situation and exposure of the trees, their distance from the sea, age, size and density ; the study of the different technical systems of tapping ; the effects of tapping on the qualitative properties of the wood and on the growth of wood in the forests ; etc. The factors influencing the yield of rosin are extremely numerous and varied in nature.

The forester, in forming a plan for the management of the forests destined for tapping, should take into consideration that an optimum number of factors or a large yield can only be obtained by managing the forests in the way most adapted to local conditions.

Forests producing rosin are generally kept as high forest. The life period must be fixed in such a way as to obtain from the forest the greatest revenue, taking into consideration not only the timber production of the forest, but also the possibility of extracting the largest quantity of rosin possible ; moreover, not only the revenue which it will give when it becomes exploitable, but also the yield of intermediary products.

Account must next be taken of the exposure and density of the stand ; a southern exposure and thinned state of the stand favour the production of rosin and the only way of arriving at an optimum is by suitable clearing and thinning, operations requiring a large measure of prudence and care. Some resin producers state, according to Mr. Buffault (France) that the best rosin producing trees are those which, after clearance, have large branches in the crown. Thinning must not be excessive however, as this would result in the large branches forming too low down, spoiling the trunk and causing risk of restriction in tapping. Moreover, the trees of excessively thinned stands do not support each other against wind on the occurrence of storms and consequently, may be uprooted. Thinning therefore should be carried out in such a way as to leave between the trees a distance sufficient to admit air and light but not large enough to isolate them.

During the period in which the pines produce hardly any rosin (for example, up to the age of 20 years for the cluster pine) thinning is carried out along the same lines as for other forest varieties not producing rosin. But, from the moment when it is possible to begin making an incision, tapping of all pines destined for felling should be preceded by their total exhaustion of rosin. Subsequent clearing is called clearing after tapping for killing.

The duration of tapping varies greatly according to the variety of tree. While the Scotch fir, according to Messrs. Kalninsch (Latvia) and Schkatelow (U. S. S. R.) may only be tapped during the last 3-5 years of its life, tapping of the French cluster pine and the Aleppo-pine may be practised over a much longer period.

The pines of these varieties which are cleared too early are tapped for killing only during 3-5 years. But the trees of the principal stand, that is the pines ready for tapping, as soon as they reach a certain size permitting an incision, are subjected to live tapping, which may last over 20-30 years until the final tapping for killing preceding felling.

The tapping for killing is always meant completely to exhaust the pine. It carries a number of incisions which increases with the size of the tree ; it is necessary that at the period fixed for felling, all the available trunk surface has been covered by incisions and utilised for tapping.

On pines destined to be felled for clearing but which it is not urgent to have removed immediately, slow exhaustive tapping is practised, beginning with the ordinary live tapping (a single incision) lasting 8-12 years and terminating when convenient with a final tapping for killing.

The quality and quantity of the yield of rosin depend, according to the experience of experts, on many factors. It is known that the various forest varieties differ in quality, but the method of procedure is also one of the most important factors from this point of view.

To-day, the quality of rosin derived from the Aleppo-pine is no longer considered to be inferior to that obtained from the cluster pine ; it is known, on the contrary, that the proportion of oil yielded by its rosin is superior. The oil of the Scotch fir with respect to its technical properties, no longer differs (Schkatelow) from that of the cluster pine (of Bordeaux and America) and for its oxydation capacities, is still more advantageous in certain uses. The rosin of the Corsican pine (of Austria) is whiter, and of more agreeable and delicate odour than that of the cluster pine ; its content of turpentine oil closely approaches that of the cluster pine.

Messrs. Oudin, Biquet and Salvat, dealing with the methods of tapping practised in France, state that : (1) that of Hughes is still far from perfect; the rosin obtained by this method contains all kinds of impurities causing oxydation by air ; as the incision rises higher, the path to be covered to reach the glazed earthenware receptacle

becomes longer and oxydation is intensified ; losses are often incurred (15-20 % of production) — (2) the Sourgen process (with bottle) gives the purest rosin ; but the total production of rosin is smaller and losses are greater than by the former system ; the rain-water which runs into the bottle remains imprisoned there by the mass of rosin instead of being displaced by it as in the vase-shaped earthenware pot used in the Hughes tapping. The Sourgen process is difficult to put into practice on a large scale.

Mr. Kalninsch (Latvia) considers the German Chorini process to be most suitable for application in Latvia ; only the improved American process (using the earthenware pot with a wooden cover) can compete with that of Chorini.

Mr. Palazzo (Italy) demonstrates, from his experience, the advantages of tapping by the scraper system. In the incisions made with the scraper, the rosin runs more rapidly and abundantly, enabling more frequent collection. The rosin obtained by using the scraper is not exposed to the air for so long a time as that obtained by other methods (French or American) ; it contains much smaller quantities of foreign substances and the rosin is of better quality. The superiority of scraper tapping lies in its profitable use in those cases where the rosin is not sufficiently fluid to run freely along the channel and arrive rapidly at the pot (tapping of the Scotch fir in Germany and the stone pine in Mediterranean countries) and the method also gives better results in elevated regions (as proved by experience in Calabria at 1,400 metres above sea level and in the Abruzzi at 1,000 metres).

Let us now examine the relation between the number of incisions and the yield of rosin. It is known that if several incisions are made on the same tree, the total production of rosin increases but the production from each incision is smaller than if the pine had only one. It is also known that an incision produces little the first year, more in the second and third years and a little less in the fourth. The yield of the cluster pines of the French dunes for ordinary live tapping or for exhaustion is estimated on the average (Buffault) at : 1.8 - 2 litres for trees having one incision — 3.2-3.6 litres for those having two incisions — 4.2-4.8 litres for those having three incisions. The evaluation of annual production of pines to be tapped for killing is as follows : 1.5 litres for trees having a circumference of 50 cm. — 2 litres for those of 60 cm. — 2.5 litres for those of 70 cm. — 5 litres for those of 120 cm. — 5.5 litres for those of 130 cm. — 6 litres for trees of 140 cm. and over. It is therefore evident that the yield of rosin is proportional to the size of the trees. The yield of rosin per annual incision of the Aleppo-pine of Vauluse (De Monchy) fluctuates from 1.4 to 2.1 kgs. ; the average yield is 1.8 kgs.

According to research carried out at Poulavay (Poland) during the four summer months, the Scotch fir produced 600-650 g. per incision (Schkätelow). Research has also been accomplished at Sologne (France) in the Scotch fir stands ; the yields given by trees having an average circumference of 1 metre were : 0.85 litre in the first year, 1.7 litres in the second and about 2.4 litres in the third.

The dimensions of the incisions are everywhere about the same. The width diminishes progressively and varies from 9 cm. during the first two years to 8 cm. the third year and 6 cm. the fourth year. For the cluster pine, their height is 60 cm. during the first year, then successively 65-68-90 cm. during the 2nd — 3rd — 4th years, that is, an ultimate height of 3 metres in the fourth year. For the Aleppo pine, their width is about the same and their average annual height is 50 cm. The depth generally should not exceed 1 cm.

Mr. Lapasse (France) remarks that a pine on which several incisions may be opened gives a larger total of rosin if the incisions are made one after the other than if the same number is made simultaneously during the same period of tapping.

The number of collections and re-openings of incisions made during tapping also have a large influence on the results. According to research carried out in France for the cluster pine, the greater the increase in the number of collections (that is, the less the rosin is left to remain in the pot to evaporate off its oil and to oxydise), the better is the quality of the rosin. There is also a considerable advantage in increasing the frequency of deepening incisions, or in other words, freshening of the upper part of the incision by the tapper (Buffault). The yield of rosin is more abundant and the quality is better.

A Scotch fir of 100-120 years gives, in Latvia (Kalmusch), using the German Chorini process: 1 kg. per tree each year if the channel is renewed once a week — 1.6-1.8 kgs. if it is renewed twice — 2 kgs. if it is renewed three times — and 2.5 kgs. if it is renewed 6 times. But these re-openings can only be practised twice a week in the middle of summer during the hot weather.

The data given above again demonstrate that the results obtained also differ according to country. This is explained by the fact the production of rosin depends on climate: the tree needs sunshine to produce it.

The length of the tapping season also varies in the different countries according to climate. It is shorter in countries having a cold climate and high altitudes. In South France for example, the first gash is made at the end of February or the beginning of March and tapping generally continues for 8-9 months. In Austria tapping takes place from May to October. There are some countries in which tapping lasts only 4 months or even less.

The influence of the distance of the trees from the sea is also well known: pines near to the sea produce more rosin than those at a greater distance from it.

Mr. Kalmusch is carrying out research with the object of artificially increasing the rosin content of the trees. Knowing that animals react to certain chemical injections, he supposes that, in the case of trees also, it might be possible to provoke changes of a physiological nature. His researches, in which he is attempting to introduce into the pines various solutions (of acids, alkalis, salts, etc.) under more or less high pressure, are still not completed. So far, he has obtained the best result with a 1 % solution of methyl alcohol, which brought about an increase of 60 % in the rosin content of the pine.

It was formerly the custom to allow one or several years of rest to the pine for fine tapping (cluster pine; Buffault, Oudin, Biquet, Salvat) after making the first incision (after 4 years) to conserve in this way the vitality of the tree and its capacity to furnish rosin. To-day this precaution has been practically abandoned and, in fact, it is not indispensable. A little rest for other reasons, however, may still sometimes be of use.

Among the greatest disadvantages of tapping has previously been mentioned the fact that the wood after tapping loses in quality and that its annual growth is also smaller during the tapping period. With respect to the former point it may be admitted that in Germany, where formerly the blue spruce was also tapped, this process to-day is rather limited to the Scotch fir and that tapping of the blue spruce has been abandoned because the incisions injured the quality of the wood; but it may also be affirmed that most of the other varieties producing rosin, do not show considerable loss as a result of tapping. As far as concerns the diminution in growth, it is evident that tapping retards the growth in volume of the pines and that this slackening in growth is the more accentuated the greater the rate of tapping. Tapping slackens increase in height of the pines more than their increase in diameter but these facts are not of great importance. In Provence, for example (Buffault), this reduction in growth has been estimated at a maximum of 2 % for

pinces live tapped and 6 % for those tapped for killing. In Vaucluse, no diminution in growth has been noticed of trees tapped. Even admitting its existence, this disadvantage is of little importance from the financial point of view (De Monchy) when account is taken of the considerable augmentation of revenue resulting from tapping.

The disadvantage attributed to tapping : namely, increased risk of fire, is no longer true. It must be recognised (De Monchy) that the trees tapped are not more inflammable than the others, as was formerly believed. From actual fires it has been found that the flames have shown no preference for the trees being exploited. On the contrary, the danger would be less because a stand of pines traversed for the regular exploitation of rosin would be kept in better order than a virgin stand and would have less underwood, which forms the principal feeder of fires ; moreover, in the event of a fire breaking out, this would be more quickly discovered so that it would be more possible to combat the menace immediately than in a stand where none of the forestry staff is present.

The great importance of tapping is also demonstrated by the fact that certain countries, by law, even compel the proprietors of forests suitable for tapping to exhaust the rosin from their woods before felling (Austrian law of 29 July 1920).

In countries which have only recently introduced the work of tapping (for example in Provence, where the Aleppo-pine has been tapped regularly only since 1919 or in Vaucluse, where tapping dates from 1922), even if the work was begun with many fears of the disadvantages involved, it was soon observed, within a few years that these fears were not justified and that the work undertaken had brought to these areas a source of unexpected wealth. Even if no account is taken of the fact that rosin extraction permits the utilisation of trees to be cleared, which otherwise in some places would have been removed as a pure loss, it may always be stated that the practice of tapping, in all the suitable forests where it has been introduced, furnishes a net gain to the proprietor and bestows a market value on a product previously not exploited.

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AGRICULTURAL SCIENCE AND PRACTICE

GENERAL AGRONOMY

Preparation of Citrus Fruits for Market in Florida and California.

The cultivation of citrus fruits and apples has been extraordinarily developed in the United States during the last few years, to the point of becoming the two most important branches of fruit growing in the country. This article is confined to the subject of citrus fruits.

For the cultivation of citrus fruit, the two leading regions are California and Florida; in the former some 300,000 acres (121,300 hectares) are given up to it, and 35 million boxes are produced every year; in Florida 18 million trees are grown on 265,000 acres (107,240 hectares), which yield more than 30 million boxes of oranges. These two regions supply the towns of the United States yearly with 120,000 vans, or 50 million boxes of oranges, grape-fruits, lemons, mandarines and other citrus fruit.

The refuse or waste of this immense production is used for the manufacture of orange juice or orange vinegar, as well as for stock feeding. Lemons of inferior quality are used in the manufacture of citric acid, calcium citrate, lemon vinegar and citric pectin. In Florida large quantities of grape-fruits are preserved. A factory for the extraction of orange juice is being installed with an output capacity of 40,000 litres of juice per day.

Several co-operative societies are already buying up all the lemons grown in California and Florida and have established in the larger towns branches and agencies for the sale of the product. These societies undertake packing also and have instituted co-operative inspection services at all the shipping centres and on the consumers' markets.

The citrus fruit industry has shown remarkable development since the war, and it will continue to prosper in countries which have a sound system of co-operation and good commercial methods. The principal hindrance to the citrus fruit industry is absence of system in growing, packing, marketing and transport of the fruit into the hands of the consumer. The formation of Fruit Exchanges in California and Florida, in addition to the investigations made by the Department of Agriculture into the causes of deterioration during gathering and transport to the consuming centres, largely contributed to the commercial development of the production of citrus fruit in the United States. A marked effect has also been noticeable on the financial results, as there has been, during these last ten years, an extraordinary progress in all the different operations of this cultivation, including the control of insect pests and cryptogamic diseases.

Both in California and in Florida the packing of the citrus crop has been standardised; reference will be made under a later heading to the dimensions and content of the boxes.

The principal market on which the States can count for the export of the fruit is Canada, which yearly takes more than 3 million boxes of oranges and more than 300,000 boxes of lemons. The exports to Great Britain and Germany have considerably increased. Almost all the imports of lemons into the United States come from Italy and from Cuba, the total quantity being about 1,800,000 boxes. Preservation is effected over a long period by means of large cold storage installations, which facilitates regular and remunerative distribution to the different consumers' markets.

The employment of uniform packing for the international trade in agricultural products will undoubtedly be of indisputable advantage to growers and to dealers, but it should not be forgotten that each consuming country prefers a certain type of packing and a definite type of fruit. It is therefore advisable for the producing centres to take this into account and to adapt their forms of packing to the preferences of the countries to which it is intended to dispatch the fruit.

Gathering. — This operation is very important and requires great care and attention; it should be carried out by skilled pickers, as it is important not to let the fruit fall nor to handle it roughly. If the fruit falls, even from an inconsiderable height, it cannot be shipped. Baskets or bags are used that can be carried on the shoulders: generally baskets are used for gathering the fruit from the lower branches, whence it can be plucked by hand without using a ladder. The basket is made of strong canvas, containing half a box; it is open above and fitted with a flat floor fastened by hooks which makes it easy to empty. The best types of bags now manufactured are those which can be made deeper or shallower by lowering or raising the floor.

The fruit should be cut from the tree very carefully precisely on the peduncle otherwise this forms a projection which may later injure the fruits in the process of handling. The type of scissors preferred in Florida for cutting the fruit is the "tuttle", short and curved. In damp weather the peel of citrus fruit is more easily bruised and torn than in dry weather.

Packing. — The development of the present methods of preparation of the fruit for the market is undoubtedly the most interesting part of the history of citrus fruit growing. Formerly these fruits were dispatched in cases, barrels and crates of different kinds and varying content, and however good was the quality of the fruit, owing to the defective methods of handling it used to arrive at the remark in poor condition.

Mr. E. BEAN invented the packing at present used in Florida for citrus fruits and its good results have brought about its adoption in nearly all the fruit-growing regions of the United States.

The boxes used for the gathering have a rather smaller capacity than those used for packing. The usual dimensions are: — width 28 inches, length 12 and depth 13, with or without cross divisions. The boxes should always be in good condition, should not have sharp or too thin edges, nails or splinters of wood, and should be subjected to detailed inspection before use. For transport of the fruit from the orchard to the packing shed, low handcarts with good springs should be used, but at present these are being replaced increasingly by lorries. After the fruit has been removed from the tree it should not be exposed to the sun, nor should the boxes in which it is to be packed. The keeping quality of citrus fruit depends on the care with which it is handled; the smallest injury allows the development of moulds.

In California and Florida the handling of citrus fruit has undergone a radical transformation in the course of the last few years; the small packing sheds placed

at intervals have quite disappeared, giving way to large central sheds thoroughly equipped for packing and despatching. In this way uniformity has been secured in the handling and packing, as well as in the product itself intended for the market. These packing sheds usually have three floors. On the first the fruit is received and washed, and on this floor also are the stores of packing material (boxes, paper, etc.); on the second floor, where the offices are found, the fruit is graded according to size and quality, and is packed, the boxes nailed down and marked with paint; on the third floor, the fruit is stored and the boxes made. These establishments must be placed at well chosen centres, so as to receive as much fruit as possible as well as being close to a railway and connected by a special siding.

The cases of fruit that are brought to the packing shed are there placed on conveyors which take them to the washing machine. After the fruit is removed the cases are carried back by the same means. In the washing apparatus the fruit passes between revolving brushes which remove all impurities and then passes on to the drying apparatus which receives a current of hot air. The fruits are carried by a conveyor to one side and removed from the other, dry. They are then taken on another conveyor to be graded. Expert operators examine the fruits as they pass along, and the rejected specimens are discarded by being placed on one of the belts of the conveyor, while the others are graded according to size and quality. Each size is transported by one of the belts to the grading machines, which separate the fruit according to established standards. Fruits of other than the round shape (lemons, limes etc.) must be graded by inspection before or at the time of packing. Speaking generally, lemons should exactly pass through a ring two and a half inches in diameter, any smaller being rejected. Fruits of prime quality should be firm, ripe, well formed, smooth, the peel thin without any bruise or injury, and free from pests, etc.

In the United States there are different standards for the citrus fruit boxes, according to the size and quality of the fruit and the method of placing it in the box. The dimensions of some of these boxes are shown in Table I.

TABLE I. — *Sizes of citrus fruit boxes.*

Types	Inside measurements in inches	Capacity in cubic inches
Boxes of oranges, Florida	12 × 12 × 24 ⁷ / ₈	3556
• mandarines, Florida	6 × 12 × 24	1728
• lemons Florida	10 ¹ / ₂ × 14 × 24	3528
• oranges, California	11 ¹ / ₂ × 11 ¹ / ₂ × 24	3174
• mandarines, California	6 × 12 ¹ / ₂ × 24	1800
• lemons, California	10 × 13 × 25	3250
• Jumbo lemons, California	11 ¹ / ₂ × 13 ¹ / ₂ × 25	3754
• Italian lemons, California	10 ¹ / ₂ × 13 ¹ / ₂ × 25	3544

Precision in grading is of the utmost importance, as it is on this that the appearance of the packing depends as also the market price. The model box for oranges is two cubic feet and the number of the fruits, according to size, varies from 54 to 250; for grape fruit the number is from 14 to 96 per box. If the fruits are exactly to fill the box, they must be so graded that each one takes the place assigned to it on the diagrams established. The fruits of an upper layer should not rest exactly on those of a lower layer, but as far as possible should alternate.

The boxes must be well made and strong; in Florida they are usually made with boards of yellow pine, the nails being of galvanised iron. Special machinery

is in use at the present time for their manufacture both in Florida and in California. All the workmen have to do is to place the wood and nails in the machine, turn the boxes over and remove them from the machine when the operation is finished. There are still certain drawbacks in the use of these machines; when these are remedied, it will be possible to manufacture all types of boxes required for packing citrus fruit. The wrapping paper used must be thin strong paper with a smooth finish in sizes corresponding to the size of the fruit to be wrapped. At the present time growers generally use coloured wrapping paper with their name and address printed on each wrapper. The sizes usually employed in Florida and California are shown in Table III.

TABLE III. — *Sizes of paper used for wrapping citrus fruit.*

Number of fruits per box		Size of wrappers
36 to	46	16 × 16 inches
54	" 64	14 × 13 "
72	" 96	12 × 12 "
112	" 150	11 × 11 "
176	" 200	10 × 10 "
216	" 252	9 × 9 "
270	" 360	8 × 8 "

It takes more time and skill to pack a box of lemons than one of oranges as the mechanical graders for lemons have still some defects. The cost of packing a box of lemons is 11 cents and that of a box of oranges 5 cents. The number of lemons per box varies from 105 to 250 or more; standard boxes contain from 300 to 360 (see Table II). Every box of citrus fruit must be provided with a label showing the box measurements (*e. g.* 12 × 12 × 24 ⁷/₈, or 1 ³/₃ bushel), the number of fruits it holds and their size. The names and marks both of the grower and of the packer must be added.

Preparation and Marketing. — As soon as the sale of citrus fruit begins on a large scale, one of the main problems for the producers, shippers and consumers is that of limiting the trade in artificially-coloured unripe fruit, especially during those months (August, November) when there being less fruit on the market, it obtains higher prices. In the fruit growing districts of the south-east of the United States it has been attempted to check the shipment of green citrus fruits, which is still carried out on a fairly large scale. In Florida, the first "green fruit" law was passed in 1911; it specified that the fruit, in order to be considered ripe, must contain at least seven times more total sugar than acid. In 1913 another standard was established which fixed the chemical composition and degree of coloration on the tree, but this question was not seriously taken into consideration until 1925. The law passed on May 20th, 1925 specified that "it is illegal for anyone to sell or try to sell, transport, prepare, receive or consign for commercial ends, any kind of citrus fruit between August 31st and November 26th of each year, except in such case as the said fruits be accompanied by a certificate of inspection and maturity, issued and duly authorised by an Inspector of citrus fruits, a State chemist, an assistant State chemist, an Inspector of the Chemical Section of the Department of Agriculture of the State, or be duly authorised by the Inspector of the Bureau of Rural Economics of the United States".

There are certain early varieties of oranges which are good to eat while the skin is still only slightly coloured or even altogether green, and there are also citrus fruits which ripen internally although remaining green externally. Sometimes, if left on the tree until maturity, these fruits become coloured, but they are insipid, less acid and less palatable than the fruit picked before maturity. The "Boone", "Parson", "Brown", and "Satsuma" varieties are subject to these variations. Late fruit, also, may be only slightly coloured even when ripe. Lemons of the better qualities must be picked while they are still entirely green; moreover, fruit which remains too long on the tree forms very thick skin and becomes less juicy. Petrol or gas stoves or gasoline machines are used for the artificial coloration of citrus fruit, and the process is now so perfected that its success is assured.

In order that the fruit may take on its natural colour (lemon yellow, tangerine red or orange), it is necessary that it should have reached a certain degree of maturity, for if it is too green it will not take a normal tint. Also, the riper the fruit, is, the less time is needed for the coloration process: it must be taken into account that the artificial colouring of the fruit does not improve it in taste or quality but only serves to give it the required tint, so that it should be picked as ripe as possible. The quantity of gas necessary to colour the fruit contained in a room of 40 cub. ft. capacity (about one van of fruit), is not very great, and two or three burners about the size of a frying-pan are sufficient. The temperature should be 24°C. Before placing the boxes of fruit in the vans they must be left from 24-48 hours in the refrigerating rooms, so that their temperature may be lowered sufficiently to allow of their transport by rail.

For transport, the boxes must be placed in the van and not moved throughout the journey, as on this depends the good condition of the fruit when it arrives at its destination. Usually a van 40 ft. wide can hold 384 boxes, and one 33 ft. wide, 360 boxes. The latter can take 2 layers of 6 by 30 rows of boxes. It has sometimes been attempted to increase this quantity by adding a third layer of boxes, but the results have been unsatisfactory. Each row of boxes must be held securely in place by slats nailed to the ends of the boxes and to the two sides of the van in order to avoid any shifting.

In the fruit growing districts of the United States a system of dispatch by air mail has been adopted for the shipment of small easily bruised fruit, such as strawberries, raspberries, cherries, blackberries, etc. The parcels may weigh up to 60 kg. The cases or baskets used for this kind of shipment are divided into several compartments in which are placed small baskets of the fruit. Usually these receptacles have a capacity of 16-20-24-30-32 cu. dm. The transport for 250 kms. of one package of fruit weighing 60 kg. costs from 60-75 cents. A label marked "Fragile" and "Urgent" is glued on to the package, with the name and address of the sender and its destination. When this mode of transport becomes more general it will be of the greatest service to the producer who at present is unable to get rid of his produce for lack of a means of rapid shipment to the big consuming centres.

The most urgent immediate problem is that of the sale of the produce, for up till now more attention has been paid to the production than to the sale. In California, the co-operative societies for the manipulation and sale of fruit were begun by the Association of Fruit Growers of Claremont, which was founded in 1892, a year in which the production of citrus in California did not reach two million boxes. In 1893 the Southern Californian Fruit Exchange came into being and in 1905 it took the name of the California Fruit Growers' Exchange. This Exchange now handles more than 75 % of the citrus crops of this region and owns

an Exchange for each of the 20 districts and 192 local exchanges. The organisation and administration of this Exchange is in the hands of the fruit growers. \$800,000 a year are spent on advertising, and the expenses of the whole organisation are divided at so-much per box on the fruit handled. It includes several Sections and Bureaux, each with its own Administrator. The principal sections are : Sale, Advertising, Legal Affairs, Accounting, Field Work, Various Services.

In Florida, there is the Florida Citrus Exchange founded in 1929 and organised on the same basis as the California Exchange, although the citrus production of Florida is not as large as that of California.

The citrus crops are sold in various ways : (1) sale on the tree to the shippers or speculators at a fixed price per box or for the whole crop ; (2) direct delivery from the producer to the agents in the different towns ; (3) sale through the Co-operative Societies such as the Fruit Growers' Exchange of California, which handle 75 % of the crops, and the Citrus Exchange of Florida which deals with more than 60 % of the production of that district. If the fruit is to obtain a good price, it must be presented in good condition, and it is therefore necessary to handle it with the utmost care in order to reduce the risk of damage to a minimum. Loss occasioned by rotting of the fruit in transit can be considerably reduced by the use of proper ventilation, so that the air is always kept as dry and fresh as possible. One of the problems which will soon have to be faced by the co-operative sales societies is that of finding new markets or of organising the distribution of the fruit in the provinces, towns and rural districts, for there are actually parts of the world where millions of people have never held a citrus in their hands, and it is in these places that it is important to introduce and make the fruit known.

Some years ago the producers were paying \$1.25 to \$2, per ton in order to dispose of oranges of bad quality and rejects. Now, in some cases, bye-products constitute the basis and more important part of the industry. In the Lesser Antilles the greater part of the lime crop is used solely and exclusively for the production of citric acid, in the form of concentrated juice and as citrate of lime. Various essential oils are also extracted, and jams, jellies, orange-juice, etc. are made, while the industry increases in importance every day.

Great progress has been made in this line during the last 20 years, but a number of problems still remain to be solved in order to perfect the culture, handling, sale, and dependent industries. Citrus growing has become a specialised commercial industry and its existence will depend in great part upon the degree of co-operation amongst the producers. For this, as for certain other horticultural products, it is not enough that the producers should strive to obtain fruit of superior quality; co-ordination, preparation and able negotiation are necessary, for, if the commercial end is not well organised and directed, even the most expert producer will not reap the benefits which this important crop can offer.

A. PASCUAL.

Notes.

Meteorology.

CORRELATION BETWEEN WINTER TEMPERATURES IN MANITOBA AND SPRING TEMPERATURES IN THE EASTERN UNITED STATES. — From a study of the temperatures in these regions during the 50 years 1874-1923 M. GROISS-MAYR finds that the climate of the two coldest months (January and February) in Manitoba has a strong influence on the March-April climate over the region of the United States extending from the Great Lakes on the north to lat. 35°N on the south and from the Mississippi on the west to the sea on the east. With a knowledge of the weather in the former a forecast of that of the latter may be made. (*Monthly Weather Review*, Washington 1930, vol. 58, no. 6, p. 246-247).

A NEW RAINFALL MAP OF THE WORLD. — This map drawn up by Mr. Erwin ECKHARDT on a scale of 1 : 100,000,000 shows the distribution of rainfall on land and sea from 1911 to 1920. The subdivisions of rainfall shown are 0-250 mm., 250-500 mm., 500-1000 mm., 1000-1500 mm., 1500-2000 mm., 2000-3000 mm., and over 3000 mm. (*Monthly Weather Review*, Washington, 1930, vol. 58, no. 6, p. 252).

HEAVY RAINS OF SHORT DURATION IN BRITISH INDIA. — An interesting comparison has been made between the climates of the British Isles and India with particular regard to short rain storms (from a few minutes to a day); only a rainfall exceeding 254 mm. a day is considered, and several records exceed even 609 mm.

In the British Isles a rainfall of 25.4 mm per hour is rare, whereas in India such an intensity is often maintained for a day or longer during the monsoons. The heaviest rainfall of one day's duration recorded there is 897 mm., and the heaviest rainfall for a series of days was that of June 14-16, 1914, at Cherrapunji, when 2036 mm. were recorded. This amount exceeds the total rainfall in London during 3 years, and only 3% of the British Isles receives as much in a year. Most of the heavy rains occur in May, June, July and August; there are a few also in September and October, but they are rare in January, March, April, November and December.

During the 15 years from 1911-1926 there are 1500 records in India of a daily rainfall exceeding 25.4 mm., whereas during all the years for which rainfall measurements are available in the British Isles there are only 3 records reaching 25.4 mm in 1802, 1987 and 1924 (J. GLASS-POOLE, *The Meteorological Magazine*, London, 1930, vol. 65, no. 779, p. 269-270).

Soil Science.

SOIL, WATER SUPPLY IN METOKHIA (YUGOSLAVIA). — At the end of the world war the new State of Yugoslavia began to colonise the agricultural region of Metokhia and between 1925 and 1928 the area under cultivation was extended from 54,000 to 80,000 ha. The annual rainfall (about 850 mm.) is not evenly distributed throughout the year, there being no rain during 2 or 3 months of the summer. As a result of this drought and the poor quality of the soils the crops are not secure without irrigation. But water is scarce and now that it has to be divided among a greater number of inhabitants the situation is becoming more serious. The only solution of the problem is in a rational economy in the use of irrigation water. M. Serge LOMFYKO, who has published a study of the question, recommends an investigation of the water supply: the abundance of rainfall, the flow of the springs, the water table and the influence of natural factors and cultivation on the water supply.

By means of diagrams he shows that spring crops cannot be grown without irrigation because during June, July and August the soil moisture content, exclusive of the "dead water" not available to roots, is scarcely equal to the hygroscopic water. Therefore without irrigation only 3 crops of lucerne can be harvested, against the 5 with irrigation.

A study of the methods of irrigation and the water table in Metokhia led M. LOMFYKO to the conclusion that insufficient attention is being paid to the two important periods, one of deficient and the other of excessive water. From the end of July to the end of August the rivers are very low, while in June they are so full that part of the water which would be invaluable at another time is wasted. He suggests utilising the superfluous water by accumulating it in the soil by irrigation in spring. The amount of irrigation required during August would thus be lowered and 30% of the water could be economised and used for irrigating fresh land.

He considers also that in some parts of Metokhia the quantity of water supplied to the meadows is not well regulated and being sometimes in excess encourages the growth of marsh plants. (*Glasnik*, Bulletin du Ministère de l'Agriculture de Yougoslavie, an 8, fasc. 31, p. 230-262; Belgrade 1930).

RELATIONSHIP BETWEEN POTASH AND THE CONSTITUENTS OF ARABLE SOIL. — The question whether the so-called 'available' potash (soluble in dilute acids) of soils is proportionate to soil elements such as clay, organic matter, lime, sand, etc. has been studied in a series of soils found near Oran by M. GALLOIS, Director of the Chemical Laboratory of Sidi-Bel-Abbes, Algeria. His results are as follows:

(1) *Correlation between available potash and potash soluble in concentrated acids.* — None. The main factors in the solubility of potash are the form and particularly the combination in which it is present.

(2) *Available potash and clay content.* — It might be expected that soils rich in clay would be the richest in available K_2O , but this does not appear to follow. The clay may be present in different physical forms which are not equally open to attack by weak acids.

(3) *Available potash and organic matter.* — No apparent relationship.

(4) *Available potash and lime content.* — A high lime content appears to be correlated with a low content in available potash and vice versa.

(5) *Available potash and all fine non-calcareous elements.* — No relationship.

It would thus appear rash to assume any correlation between the availability of potash and the constituents of the soils studied. (*Revue générale des Sciences*, Paris 1930, tome 41, No. 17-18, p. 491-492).

IDENTIFICATION AND APPROXIMATE DETERMINATION OF FREE SESQUIOXIDES IN TROPICAL SOILS. — It is known that various tropical soils, specially laterites, contain a considerable proportion of hydrates of aluminium and iron. For their determination Mr. F. HARDY (*Journal of Agricultural Science*, London 1930, vol. 21, part 1, p. 150-166) has perfected a method invented by SCHMELEV (1928), which consists in treating the soil with a hot alcoholic solution titrated with alzarine (red) saturated with boric acid, then filtering and determining colorimetrically the proportion of indicator in the filtrate not adsorbed by the soil. The difference gives the quantity of alzarine adsorbed. Mr. HARDY finds that iron hydrates adsorb alzarine well when unburnt, but aluminium hydrates only after calcination. This difference in behaviour makes it possible to test for the two classes of hydrates separately and the colorimetric method permits of a simple and rapid determination. It is not an accurate method but allows of a rapid preliminary test for selecting from a large series of soil samples any worth exact quantitative analysis.

Mr. HARDY considers the method is capable of interesting applications in the study of soil origins, of physical properties of soils, of the constitution of clays, of exchange of ions in soils, etc.

T. B.

Fertilisers and Fertilising.

WORLD PRODUCTION OF NITROGENOUS FERTILISER COMPOUNDS. — M. PARRAVANO (*L'Italia agricola*, Piacenza 1930, anno 67, n. 9, p. 590) gives the following figures for the production (expressed in tons of combined nitrogen) from 1922 to 1929, showing that there has been a steady increase.

	1922-1924	1926-1927	1927-1928	1928-1929
Synthetic ammonium sulphate	231 100	300 000	367 000	485 000
Ammonium sulphate as by-product	264 600	328 200	368 000	376 000
Total ammonium sulphate	495 700	628 200	735 000	861 000
Calcium nitrate	338 500	199 600	390 000	490 000
Chili saltpeter	18 000	81 000	105 000	136 000
Calcium cyanamide	104 000	180 000	204 000	210 000
Other synthetic nitrogenous compounds	51 100	133 400	236 000	365 000
Other nitrogenous by-products	50 200	42 300	54 000	51 000
Total nitrogenous compounds	1 057 500	1 264 500	1 724 000	2 113 000

DECOMPOSITION OF UREA IN THE SOIL. — This is a micro-organic process of importance for agriculture on account of the large quantities of urea supplied to the land in the form of liquid animal excreta, as calcium cyanamide (as an intermediary product in the formation of ammonia), by micro-organic decomposition of protein and as dressings of synthetic urea.

Various writers have already shown that in solutions inoculated with soil and in the soil itself urea is rapidly transformed into ammonium carbonate. On the other hand the urea-decomposing bacteria may be absent, specially in certain peaty soils, which perhaps accounts for the low availability of calcium cyanamide when applied to these soils.

Mr. T. GIBSON (*Journal of Agricultural Science*, London 1930, vol. 20, part 4, p. 549-558) has studied the decomposition of urea in 59 different soils and has obtained the following results.

Urea was fairly rapidly converted to ammonia in all the soils and very rapidly in certain of them. Conversion was more rapid in permanent grassland and forest soils than

in arable soils. It was active even in mountain, heath and acid peat soils. In these last the amount of urea converted to ammonia in 24 hours was from 0.44-0.86 parts in 100 parts of dry soil; in grassland soils it reached 1 %.

Although urea may not be absorbed by the soil it is transformed so rapidly into absorbable ammonium carbonate that there is no risk of its being carried away by leaching.

IS IT ADVISABLE TO MIX CALCIUM CYANAMIDE AND SUPERPHOSPHATE BEFORE USE ?

It is convenient to mix the two instead of applying them separately because it saves time and labour as well as facilitating spreading, but it has been doubted whether the heat produced in the mixture causes loss of nitrogen in volatilisation and too great decomposition of the superphosphate by the calcium cyanamide. M. DANSI (*L'Italia agricola*, 1930, no. 9, p. 601-604) has made an experimental study of the question which proves that such fears were without foundation. There is no loss of nitrogen and the water-soluble monocalcium phosphate is only converted to bicalcium phosphate which is soluble in ammonium citrate and so still available. The mixture is thus to be recommended provided that it is made shortly before use, for harmful transformations might occur with time. The fertilisers should be mingled in thin layers to avoid excessive rise of temperature.

FRENCH PRODUCTION OF POTASH SALTS IN 1930. — During the first 8 months of 1930 there was an increase in production, expressed in pure potash (K_2O) of 12 % compared with that during the corresponding period in 1929 (263,155 tons against 235,428). The increase concerned mainly carnallite and sylvinite. The production of the double sulphate of potassium and magnesium has on the other hand greatly diminished, and less nitrate, carbonate and chloride of potassium were produced. The following table shows the exact quantities (in tons) of the various salts produced during the two periods.

	1929	1930
Carnallite and sylvinite	439 536	517 474
Potassium sulphate	1 326	1 034
Double sulphate of potassium and magnesium	36 269	53
Potassium chloride	30 533	20 939
Crude potassium nitrate	112	66
Refined potassium nitrate	4 255	2 819
Potassium carbonate	407	265

T. B.

Ecology.

INFLUENCE OF RAINFALL DURING PERIOD OF MAXIMUM GROWTH ON CROP YIELDS. — This subject has been studied at Wurtemberg by M. GÖSELE (*Wissenschaftliches Archiv, A, Pflanzenbau*, Berlin 1930, Band 4, Heft 2, p. 271-291), who obtained the following results :—

Excepting sugar beet all the crop plants studied had their yield reduced if much rain fell during their period of maximum growth. This was mainly because the Wurtemberg soils are of a heavy type.

For autumn wheat the critical months are June and July; heavy yields are obtained only if these months are comparatively dry.

For spring barley to give a good yield July must have little rain.

For oats March and April must be dry. Heavy rains in June increase the yield, but in July and August reduce it.

Sugar beet, on the other hand, required abundant rain in July, August and September.

T. B.

CROPS OF TEMPERATE REGIONS.

General.

AGRICULTURAL RESEARCH IN THE UNITED STATES. — The United States Department of Agriculture has issued *Miscellaneous Publications* No. 89, November 1930) a classified list of projects of the agricultural experiment stations similar to that published in 1927. The list includes a large section dealing with temperate field crops and horticulture and will be invaluable to research workers in other countries wishing to get in touch with stations concerned in studies similar to their own.

Cereals.

TIME OF HARVESTING CEREALS. — Experiments in Iowa, Minnesota, Ontario and Alberta indicate that a considerable part of the crop of wheat, oats and barley is usually harvested before maximum production has been attained. Data obtained in Iowa for yield and moisture content of grain harvested at half-weekly intervals from mid-July to mid-August show increases in yields which indicate that photosynthesis and translocation of food material to the kernel may continue much longer than has been previously reported. The yields continued to rise until the moisture content of the grain of wheat and oats had fallen to between 38 and 10 %. The Minnesota experiments have shown that there is no advantage as regards yield in premature harvesting of rust-infected wheat and oats. Also it was found that no difference in kernel weight could be detected between grain dried in shock in the regular manner and dried in the oven immediately after harvest. Thus there is no appreciable transference of material from the straw to the grain after harvest. These results are of particular interest in view of the increasing use of the "combine", which reaps and thrashes the standing crop in one operation. The combine necessitates a study of the delay in harvest required for the successful storage of the grain. To avoid all risk of heating it is necessary to reduce the moisture content to about 14 %. Any desiccation necessary after combine harvesting of fully ripe cereals can be carried out at small cost with the grain drier constructed by the Oxford Engineering Institute. (WILSON and RALEIGH, *Journ. of Amer. Soc. of Agronomy*, 1929, vol. 21, no. 11. — BURNETT and BAKKE, *Iowa Research Bulletin* 130, 1930. — WATSON and BRIDGES, *Scottish Journ. of Agriculture*, 1931, vol. 14, no. 1).

GEOGRAPHICAL LIMITS OF WHEAT GROWING. — The countries in which large areas of grassland capable of growing high-grade wheat occur are, in order of their importance: — Russia, United States, Canada, Argentina, Hungary, Australia, Rumania, Bulgaria, Greece. The soils of the wheat lands are of two classes, black and dark brown, and occur predominantly in continuous belts following climatic zones running parallel to the great mountain ranges. The black soils are known as chernozem soils; they are highly productive and have developed in a region with an annual rainfall of from 16 to 20 inches. The moisture supply is therefore such as to render crop failures possible but not frequent. The chestnut-brown soils have a lower percentage of organic matter and nitrogen, they are less fertile and occur in a region with a lower rainfall. Crop failures in this belt are more frequent than in the chernozem belt and yields in normal years are less. As the direction of the belt is north and south in the continent of North America the temperatures are not suitable for wheat throughout the whole belt. Across Siberia and European Russia the belt runs east and west in practically uniform temperature conditions.

The point to be emphasized about the chernozem-chestnut belt is not that it produces high-grade cereals, but that it is a region in which the growth of other crops than wheat or barley is difficult. The following table gives the area in this belt in Russia and the part of it in the United States which has temperatures suited to cereals compared with the area under cereals (wheat, oats, barley) in the two countries in 1929.

	U. S. A.	U. S. S. R.
	acres	acres
Area of chernozem-chestnut soils in wheat-growing climate.	234,545,920	854,503,040
Area under cereals (wheat, oats, barley)	114,522,375	142,074,400
Area capable of development for cereals	120,023,545	712,428,640

Thus there were in 1929 in the United States and Russia respectively approximately 120 million and 712 million acres of chernozem-chestnut soils not yet down to cereals.

Russia is developing this land fast. In 1933 she expects to be able to export 200 million bushels of wheat. In view of this and of the fact that the British Empire already produces more wheat than it consumes it seems essential that wheat growing throughout the world (except for stock feeding purposes) should be confined to the soils and climates which are suited to cereals.

Western Europe, according to Mr. MARBUT (Chief of the Division of Soil Surveys of the U. S. Dept. of Agriculture), is a region with a humid climate, poor soils and giving a low yield of poor quality wheat. This region is, moreover, not readily adaptable to modern developments in power farming. The use of the combine in the wheat belt of the United States has reduced the costs of production to such an extent that it has

been stated that a price of 50 cents (2s 1d) per bushel will give farmers the customary return on their land, labour and capital. The English farmer, it is claimed, would need 6 or 7 shillings a bushel to make wheat growing profitable. (MARBUT, *Geog. Review*, New York 1931, vol. 21, no. 1. — *Inter. Yearbook of Agric. Statistics*, 1929-30. — WATSON and BRIDGES, *Scottish Jour. of Agriculture*, 1931, vol. 14, no. 1. — ORR, *Ibid.*).

Fodder Crops.

SUBTERRANEAN CLOVER. — Subterranean Clover (*Trifolium subterraneum*), was developed as a crop plant in South Australia and has since been introduced into almost all countries having a temperate climate. But it deserves to be still more widely known. Maximum results are secured in regions having a mean annual rainfall of from 22-40 in. and a growing period of about 8 months between the autumn rains and the dry weather of summer. This clover appears able to accommodate itself to almost all types of soil and, given suitable climatic conditions and sufficient phosphoric acid, will grow well in calcareous, clayey, sandy and peaty soils, but gives best returns in well-drained fertile loams. Much of its value depends on its ability to thrive on the "sour" soils which are plentiful where a heavy annual rainfall is combined with a temperate climate. The plant is an annual, but as the flower heads grow downwards and bury most of the seed it is equivalent to a perennial and when once established is practically permanent. Seed should be sown in early autumn. Subterranean clover is grown mainly for grazing in the green state, but makes also a palatable hay and is a really good "dry" feed if left to mature before being grazed. (SPAFFORD, *Bulletin* 240, Dept. of Agric. of S. Australia, Adelaide 1930).

A. M. F.

TROPICAL AND SUBTROPICAL AGRICULTURE

Systems of Agriculture and the Position of Tropical Agriculture.

II.

Although we have made a distinction between the methods used to prepare the soil for growing crops and the methods to maintain or restore its fertility, agricultural practice is such that both converge into one. The labour of the farmer for the working of his fields at the same time influences the productivity of the soil and what he does to maintain soil fertility has its influence on the growing crop as well as the method used for the preparation of the fields.

All agricultural activities are founded upon existing ecological conditions and their improvement in relation to the requirements of the crops to be grown. As agriculture is an economic occupation and man's existence is dependent upon its results, it is of utmost importance that the result of his labour should be as favourable as possible.

It is therefore a necessity that the farmers' efforts should be in accordance with ecological conditions; he has to make use of them. It is essential that the plants he grows are adapted to these conditions, that the animals he breeds are adapted to the climate as well as to the food that nature offers them.

But although he has to adapt his business to his ecological surroundings, at the same time he will have to intervene in favour of his crops. As soon as he makes a clearing in a forest or burns the grasses of the steppe, he changes the ecological conditions.

We may say that it is impossible for the farmer to have any influence on the heat factor. He can only adapt the choice of his crops and his labour to it. Only in horticulture this factor may be influenced by man. It is different with the light factor. It is possible within certain limits to change the light conditions of a given place. In a forest light may be intensified by clearing, in an open country it may be lessened by planting shade trees for a lower growing crop. Also the water fac-

tor may be changed. It is possible to remove water by draining or to supply it by irrigation.

This modification of one factor has its influence on others. When light is intensified by forest clearing, atmospheric humidity, soil moisture conditions and soil properties are changed at the same time and thereby also natural vegetation, apart from the cultivated plants. When soil is drained its properties may change enormously and under certain conditions the heat factor and atmospheric humidity also. The same may be true of irrigation and to a larger degree when more water is supplied. A desert soil may be changed into a mud pool.

Soil conditions are very apt to undergo alterations, not only by the indirect influence of changing light and humidity conditions, but also by the direct influence of labour, by the crops that are grown and harvested, by the application of humus forming material and chemicals.

It does not often happen that a country devoid of forest growth is changed by planting of trees. In most cases where forest is planted to a large extent it is a question of re-forestation. But this is only practised on soils not suitable for agriculture. In naturally forestless countries the natural conditions prevent forest growth and it is not possible to interfere, with the possible exception of certain small areas.

We therefore may say that, in general, the farmer does not influence the light factor in open countries. But in forest countries it is different.

It is possible that by clearing a part of the forest while provision is made in regard to drainage, and by working the soil, its properties are changed, but the most characteristic feature is the changing of the light factor. This gives agriculture in forests its own character of which we will speak later.

This forest agriculture is limited to certain parts of the world. It can only occur where forests exist, and forest growth is confined by ecological factors, largely of climatic and geographic origin.

The open countries were originally for the most part covered by forest. The western part of Europe, the eastern States of North America, the lowlands of Java and Bengal, southern China, for example, which are now open, once were forested. By the removal of the forest they have not lost their adaptability to forest growth; it is only the interference of man that prevents them turning to forest again.

Other large areas of the world are forestless as conditions do not allow of forest growth. They are covered with savannah, steppe, bush, or their vegetation is extremely scarce and we call them desert.

It must be clear that the difference between forest country and deforested country is less than between these and countries that are forestless by nature. The landscape of the second may resemble more that of the last but the ecological character of the last differs much from the others. Ecological conditions permitted forest growth in the first and second and prevented it in the last.

What has been the most important factor involved? In some places it has been temperature. In the extreme north and south and at high altitudes in mountain regions it was the low temperature that prevented forest growth. But this same condition also prevents agriculture proper and it is not possible to influence it.

In other places it has been lack of moisture.

WARMING (1) says: "no other influence impresses its mark to such a degree upon internal and external structures of the plant as does the amount of water in

the air and soil, and . . . no other influence calls forth such great and striking differences in the vegetation as do differences in the supply of water”.

It has been demonstrated repeatedly that, to a certain extent in accordance with the nature of the plant, a larger supply of water yields a richer crop.

And so it is not to be wondered at, that the efforts of farmers in regions liable to water shortage are directed in the first place to measures which will ensure moisture conditions as favourable as possible to their crops. It is self-evident that the cultivated plants of these regions are adapted to their ecological conditions. They are therefore not only drought resistant, but as soon as the moisture supply moves from the optimum to too great abundance their growth will be checked and their yield will diminish. Farmers in these regions however have more to fear from moisture shortage than from excess.

Nature seldom traces boundaries ; the transition from one region to another is almost always gradual. And so it is not possible to give the exact limits between the country adapted to forest and the regions where conditions are adverse to forest growth. And so too, agriculture from the steppe may invade the forest country as well as forest invading the steppe. The former however is bound to take place more often, as climatic conditions may change from one period to another. Sometimes a sequence of years makes farming conditions possible in regions which may be extremely arid in other years. But also, extremely dry years may force farmers back from the forest boundary into the forest.

It is a human trait to adhere to the cultivated plants and domesticated animals that form the economic outfit of a farming community. They always followed human tribes on their wanderings. And so too, in invading the forest country the steppe farmer took with him his grain seeds. And so they came to grow under ecological conditions which were different from those in their home country. The humidity factor was different, in some places it was in excess. And here farmers had to adapt their methods to these conditions ; they insisted on the cultivation of crops from an arid country in a more humid one and so they had to take care, that no adverse conditions should arise from the larger humidity. They had to get rid of excess of water. Where this was not possible by the topography of the country they did not settle.

It will be clear that in those parts of the forest adapted countries bordering the steppe region, about the same agricultural methods are and were practised as in the dry regions. But where humidity increases the farmer has to provide in a more or less thorough way, artificially arid conditions. It is of course not possible to influence climatic conditions, but by draining the soil it becomes possible to grow crops, which originated in arid countries. Where drainage was not possible the country remained for long uninhabited by farmers. Other factors were necessary to bring these parts of the country into use.

Cultivating the soil of a humid country has a different effect from that in an arid one. The properties of the soil are changed very much more, its fertility is influenced much more strongly. Farming methods must be adapted to these differences.

In the south eastern part of Asia however conditions differ greatly. The forest country of this part of the world is separated by an enormous mountain barrier from the steppe regions. On the other hand it is the place of origin of a grain which is adapted as well to swamp conditions as to those of dry soil, provided there is sufficient moisture.

Here too forest disappeared and an open country was established in its place. This country has much greater rainfall and humidity than the European forest coun-

tries. Even if man had tried to drain the valleys and plains, it would have been impossible in the wet season. But rice, adapted to swamp conditions does not need drainage. And so especially the low regions, exposed to inundations, were sought by farmers to raise their grain crop. And where the topography of the country prevented swamp formation in a natural way, man, by building dams and ditches, made swamps even on terraced hillsides.

There are of course between these wet ricefields more or less extensive areas which cannot be irrigated. In as far as they too are used for crop raising do they belong to the same farming category as arable fields in western Europe. But more than that : in the same region perennials are also grown which, for the most part, require ecological conditions that may be called forestic. So we find in many places of South Eastern Asia three different systems practised often by the same farmer.

But rice culture on land in swamp condition dominates the whole.

In the desert cultivation is not possible if water is not supplied by man. And as of course the quantity of water to be found is very limited, cultivation is also limited to certain relatively small parts of the desert.

It is not only the humidity factor that influences plant growth in the desert, but radiation as well. The great aridity of the soil, the very low atmospheric humidity and the cloudless sky expose plants to an intensive action of light as well as of heat. Differences between day and night temperature are enormous and the dry atmosphere causes a transpiration such as is only to be found here.

Only a limited number of plants are adapted to these extremes, notwithstanding artificial irrigation, of which the date palm is the most useful. It also provides shelter to other plants growing in its shade.

The influence of the desert reaches farther than its own borders. Desert winds may cause desert conditions at large distances, necessitating planting only such plants as are able to withstand them and providing shelter for less hardy ones.

As has already been indicated stock raising finds its place in these agricultural conditions.

Summarising we find the following systems :

A. *Forest agriculture.*

- | | | |
|--|---|--|
| 1. Mainly on forest soil. | } | Livestock restricted to small animals ;
of not much importance. |
| 2. Plants requiring forest conditions. | | |

B. *Agriculture in arid regions.*

- | | | |
|-----------------------|--|------------------------------------|
| 1. Stock raising | Cultivation of crops not of much importance. | Livestock the dominant factor. |
| 2. Dry farming. | | Livestock of not much importance. |
| 3. Irrigated farming. | | Livestock of differing importance. |

C. *Agriculture in humid regions on dry soil.*

- | | | |
|---------------------|-------------------------------------|--------------------------------|
| 1. Arable farming | preponderant. | Livestock not important. |
| 2. Mixed farming. | | Livestock very important. |
| 3. Pasture farming. | Cultivation of plants not important | Livestock the dominant factor. |

D. *Agriculture in humid regions on irrigated soil.*

- | | |
|---------------------------------------|-----------------------------------|
| 1. Only rice cultivated. | Livestock of not much importance. |
| 2. Rice alternating with other crops. | Livestock of more importance. |

Each of these systems shapes the farming of the region and determines its possibilities of development. It is impossible that a country adapted to agriculture of the second type should develop along lines followed by countries of the third or fourth type. STOCKDALE was therefore right when studying conditions in Sierra Leone and looking for a model by which these could be improved, he turned to those countries where the ecological conditions of farming are approximately the same. The problems of Sierra Leone are not solved by the introduction of new crops only but by the introduction of a system of which these crops may form a part.

But the farming system limits also the possibilities of production of the persons occupied in farming as well as of the land. We should take care not to compare farming types which differ in grade of development, but only those types which are at about the same stage of advancement. It would be wrong to compare results of native herding in East Africa with Japanese rice farming or with grain raising with modern implements on the American plains. But we may compare the last two. And then we see that some systems make possible a very large production per man and that other systems do not give that possibility; and at the same time we see that production per unit of area does not need to run parallel with production per man.

These facts have had and, so far as the structure of a country is built on agriculture, will always have an enormous influence on density of population and distribution of population, and thereby also on the economic and social structure, not only of the farming population but of the whole country.

It is not the kind of crops grown which exercises the main influence, but the system of which they form a part. It is not the wheat that makes the farming community of the American plains take a different shape from that of France, but the system of farming.

It has been the possibilities and limitations of the agricultural systems that have forced nations to take different paths of development in history. Where there were definite limitations nations were forced to look for other means of existence, and where with such limitations the possibilities of developing a highly specialised type were favourable, development of trade accompanied that of farming (Norway, Holland). In countries, however, which possessed possibilities of many kinds rural occupations were always predominant.

Scientific research and the application of its results originated in the countries of western civilisation, where agriculture belonged to the third system. And even here it is only recently that the problems relating to pasture farming have been understood to be different from those of arable or mixed farming. The problems of the second system, of agriculture in arid countries, have not long been the subject of scientific research, the United States taking the lead in it. Still more recent is the investigation of agriculture in forest countries and it is mostly by the interest of European enterprises in the tropics that attention has been drawn to it. The fourth system, however important it may be, is the last to which attention has been paid and that only recently.

It is not to be wondered at that many problems are not yet solved. With

regard to the first and the last system we may even say that very much has still to be done to formulate the questions that need research.

There are of course many points common to all these systems, as they are all manifestations of the same kind of business; they all occupy themselves with the production of plants and animals by man for his own benefit.

The principles of the study of plant diseases and pests do not differ from one system to another, and the same is true with regard to animal diseases and to questions of animal and plant breeding. It may be that special adaptations are necessary for studying special diseases or special insects, or that selection methods differ more or less according to the type of plant to be improved, but it is not the agricultural system as such which influences these working methods, but the biological make up of the individual species.

There is still more conformity between the study of these systems and that of the types of soil.

Agricultural science however is not a mixture of these different branches of knowledge, nor even a synthesis of them. It has its own object: agriculture as it is practised.

Where is now the position of tropical agriculture?

It will be clear from the foregoing that there is not such a system, differing from others, that could be called a tropical one.

Agriculture in the tropics is not a unit. It is not possible to put into one system the farming of the Sudan, the herding of Kenya, the "ladang" of Malaya, the rice farming of Burmah, the plantation farming of Australasia.

When we study the different forms of farming in the tropics, we can only conclude that they too belong to one of the systems mentioned.

These systems do not conform to geographical conceptions. The third system, mainly limited to countries inhabited by Europeans, is also practised in the tropics; the second is not limited to North America or Australia but is practised in the African and Indian tropics as well; the last is not limited to the tropics but stretches from the South of Asia along its east coast near to the Vladivostok region of Siberia.

Perhaps we may say that the tropics are richer in agricultural systems than other parts of the world, as ecological conditions offer more divergence.

What then is the reason that agriculture in the tropics is still always considered as something standing apart and having its own character, forming more or less of a unit?

It seems that two causes may be responsible for it: in the first place the circumstance that science got in touch with agriculture in the tropics mostly on behalf of European interests and in the second place because botanists started the first investigations.

The first contact with agriculture in the tropics was of a purely commercial character, products of native agriculture being brought to Europe and America. The increasing demand for these products caused the traders and the European governments to promote their production. It was botanists who went in search, of the plants, who produced the desired products, and the botanic garden took an active part in the distribution of the plants to other tropical countries.

Not much later European enterprises were started in the tropics to produce the products which till that time were obtained only from the natives. Much capital was invested and they were exploited for a profit. An agricultural enterprise was thus established differing in many respects from the farming business of the European countries of that time.

When difficulties arose in the production process they were mostly caused by

plant diseases and insect pests. And so the second contact of science with agriculture in the tropics was of a botanical and entomological character. When first quality soils were no longer easily found soil science stepped in and when competition began to require lowering of the cost of production selection specialists were engaged.

But all this scientific work on agriculture in the tropics had to do only or almost only with that peculiar form that was created by European enterprise. And when tropical agriculture is discussed it is generally this form of agriculture that is meant. This "tropical agriculture" however is only a small part of agriculture in the tropics, it belongs for the most part to the system *A*, mostly *A*₂ and only a part of this, as its peculiar organisation differs very much from that of the native *A*₂ system.

It was not until Colonial Governments began to take an interest in native agriculture and European agronomists were engaged on behalf of this native business that it became clear that native farmers by centuries of experience had developed systems that are in accordance with ecological conditions.

It is not long since native agriculture was still looked upon as backward compared with plantation agriculture and that a solution was thought to be found when native farmers applied the same principles to their business as are applied in European enterprises. In most of the more advanced colonial countries this idea has been abandoned. Native agriculture has been recognised as principally right and all experts on this subject agree that it has to be developed along its own lines.

It is therefore, on behalf of the most important branch of agriculture in the tropics, the native one, of utmost importance that the methods and principles of native farming should be studied. These studies should not be of botanical or agrogeological character but should be carried out by agronomists. And as a result of their investigations they will be able to ask for special research on botanical or other lines.

In some Colonial countries the organisation of the Department of Agriculture is based on these principles.

M. B. SMITS.

Nôtes.

JAPANESE RESEARCH ON SOME IMPORTANT DEFECTS OF DECORTICATED RICE. — Apart from other causes which may impair the quality of rice, there are three defects which are of general importance and on these KONDO and OKAMURA have made investigations of real value. The defects investigated are: brown coloured kernels, greenish coloured kernels and breakage.

1. *Brown kernels.* — It has been found that brown coloured kernels are always formed when the stamens have been enclosed in the husks, or when the grain has been infected by *Helminthosporium*. Many brown coloured grains are always formed when ripening conditions are unfavourable.

An experiment was made in which rice was grown under such conditions that it was possible by artificial rain to study the influence of atmospheric conditions during and after the flowering stage.

It was discovered that "brown" was already developed only a short time after flowering and that from that time till ripening the percentage of brown increased. The grain is ripe 60-70 days after flowering and at and after that time no more "browns" are formed.

It sometimes occurs that the ear is prevented from unfolding, being kept back by the sheath of the leaf. In such cases a large number of "browns" are formed.

If there is no rain at or after the time of flowering no "browns" are formed. But the reverse happens when it is raining at that time, and the percentage of "brown" increases with the frequency of rain. With very much rain the husks also turn brown.

2. *Green kernels.* — The green kernels are smaller than the normal ones, their spe-

cific gravity is less and their resistance against breakage and pulverising is also less. This is caused by immaturity. The green colour is caused by the same reason, there being chlorophyll in the pericarp. It has been found that bran of the green grains is thicker and makes a larger percentage of the total weight than in normal grains.

The number of green grains is in general larger in the lower parts of the ear and on the secondary branches. A positive correlation has been found to exist between the time of flowering of the individual flowers of an ear and the occurrence of green kernels.

When after cutting the rice it is dried in full sunshine the number of "greens" is low; drying in the shade however augments it. The same is true when rice is dried in sheafs; the outer ears do not form many greens, but the inner ears a great number.

When artificially dried at a temperature of 70°C, or at a low temperature in a desiccator by CaCl₂, the number of greens did not show any difference.

It may be summarised that green kernels are formed as a result of insufficient ripening and of drying without sunshine.

3. *Breakage*. — Breakage of rice is mostly caused by small fissures in the kernel; during polishing the rice breaks at these places.

It has been found that when dried in the open the number of defective grains is larger in the outer parts of the sheafs, and larger in big sheafs than in small ones. When after cutting the rice is exposed for two hours to rain the number of defective grains is already large. By increasing this period of exposure the number of defectives also increases.

By rapid drying after rain the formation of defective kernels may be prevented. But when well dried grain can absorb moisture from the air a large number of defectives is formed. Only by dry storing after drying may this be prevented.

This increase in defective grains after rapid drying is proportional to the intensity of drying and the humidity of the atmosphere in which they are kept.

It is beyond doubt that increase of moisture content of artificially dried grains is the main cause of the increase of defective grains. It is therefore very important to provide for air-tight storage for such rice. (M. KONDO & T. OKAMURA, *Ferichte des Ohara-Institut für landwirtschaftliche Forschungen*, Kurashiki — 1927, Bd. III, Heft 4, S. 405-419 — 1929, Bd. IV, Heft 2, S. 173-180 — 1930, Bd. IV, Heft 4-5, S. 413-428, 429-446).

COCONUT PALMS IN COCHINCHINA. — The extent of the coconut plantations in Cochinchina varies very little from year to year. The principal centre of cultivation is in the delta of the Mekong. The area under coconuts and the exports are given in the following table :—

Year	Area	Export
1925	18,890 ha.	—
1926	19,025 "	10,842 tons
1927	16,000 "	—
1928	18,222 "	10,458 "
1929	19,258 "	12,201 "

(*La Cochinchine Agricole*, No. 8, août, 1930).

TOBACCO IN THE PHILIPPINES. — Most of the tobacco is grown on the small estates. The provinces producing most are Isabela, Cagayan, Pangasinan and La Union. The number of tobacco planters in the islands is about 100,000, of which 60 % are in the valley of Cagayan, 25 % in Pangasinan and La Union and 15 % in the remainder. The following table shows the area under tobacco and the production from 1925 to 1929.

Year	Area	Production
1925	71,630 ha.	910,910 quintals
1926	74,790 "	988,010 "
1927	83,970 "	1,091,660 "
1928	75,000 "	900,000 "
1929 (estimate).	65,000 "	700,000 "

(*Revue Internationale des Tabacs*, November 1930).

AGRICULTURAL ENGINEERING.

Improved Straw Shakers for Thrashing Machines.

Even the most modern thrashing machines do not eliminate certain losses of grain, viz, *thrasher losses*, resulting from an imperfect separation of the grain from the ears in the drum, and *shaker losses*, resulting from grain being carried away with the straw from the shaker. With the types of shaker used hitherto the grain thus lost could be recovered only by providing a second shaker, which inconveniently lengthens and complicates the machine and adds to its cost.

The amount of grain lost varies considerably with the type of straw shaker, the losses being least with those that beat the straw vigorously. A loss of 0.3 % is considered low.

In a work on motor thrashing machines, VORMFELDE (1) allows, by way of an example, that 0.6 % of the grain remains in the straw. Allowing an average loss of 0.3 % for the whole grain crop of 1929 in Germany (23 million tons) the total loss of grain would be 69,000 tons. With the combine harvester-thrasher the grain losses in the shaker are considerably higher. According to the length of straw they admittedly vary from 2 to 5 % (2). They are all the more regrettable because they cannot be avoided (the grain falling to the ground and thus being lost) so long as the shaker has not been perfected.

There would thus be a considerable advantage, from an economic point of view, if these losses could be reduced, particularly with the combine. It would appear that this result may be achieved by improving the screen of the shaker. The screen is imperfect technically, specially in the primitive shakers for long straw, in which it consists of parallel wooden crosspieces or slats. Fig. 1 shows in transverse section how much surface is uselessly occupied by these slats, because being placed flat they leave little space between them. If the space is narrowed by putting the slats closer together the number of slats and hence the useless surface must be increased to the detriment of the liberation of the grain.

To remedy this defect M. GRAEPFEL (Halberstadt, Germany), has constructed a screen formed of parallel slats of doubled metal (fig. 2). The free screening space is not reduced more than by the transverse metal slats which were at first placed flat (fig. 3), but, since a recent improvement, are placed edgewise (fig. 4) so as to reduce their useless surface almost to nil. In this way much free space (fig. 2) is obtained, which has the great advantage of allowing air to pass freely during the upward and downward movements of the shaker, so that the straw no longer "adheres" to the screen (the sense of this expression is readily understood by regarding the shaker as an unperforated board from which the straw scarcely moves as it rises and falls because the downward movement of the board causes a suction which holds the straw in place). The greater the space between the slats allowing free passage of air the more freely can the straw rise and fall. This screen has also a powerful "beating" action because the slats occupy so little space that they can be multiplied in number.

These facts have been proved in a hundred tests carried out by DAHRENMÖLLER (3) with an experimental machine at the Machine Testing Institute of the Hannover Polytechnic School. For studying the efficiency of the shaker a new device was used that has not been previously reported in the literature of the subject.

The shaker was divided lengthwise into 6 compartments, under each of which was suspended a sack. The contents of each sack (grain and small straw) were accurately weighed. The diagram in fig. 5 represents a typical result. With the wooden screen the greater part of the grain does not separate from the straw until compart-



FIG. 1. — Transverse section of shaker with longitudinal wooden slats (40 % waste surface).



FIG. 2. — Transverse section of GRAEPEL shaker with longitudinal slats of doubled metal.

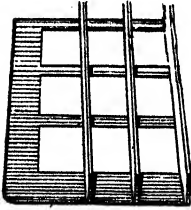


FIG. 3. — Transverse metal slats placed flat.

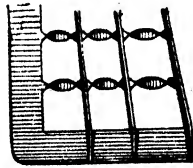


FIG. 4. — Transverse metal slats placed edgewise.

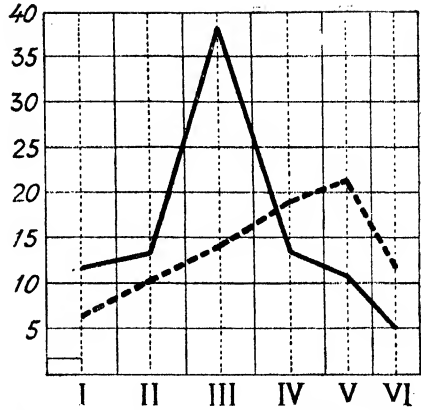


FIG. 6. — Comparison of the efficiency of the two shakers when overloaded.

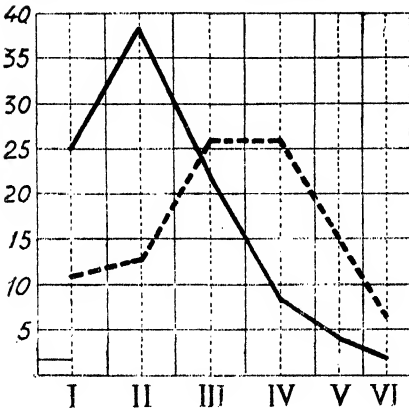


FIG. 5. — Comparison of the working of the GRAEPEL shaker (—) and the shaker with wooden slats (-----). I to VI = shaker compartments.

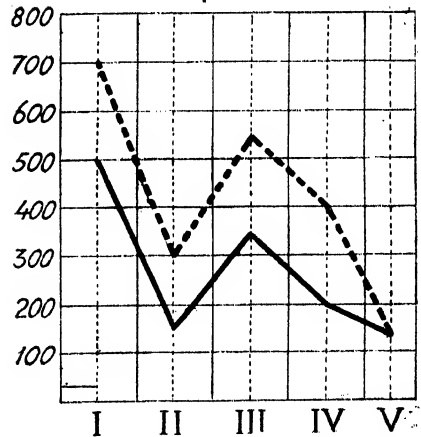


FIG. 7. — Comparison of the quantities of small straw passing the two types (-----) of shaker. (—).

ments III and IV, whereas with the GRAEPEL screen it does so in the first, and by the fourth compartment this screen has effected as much as the wooden one along its whole length. The GRAEPEL screen can thus be made shorter than a wooden one.

Fig. 6 represents diagrammatically the behaviour of the two types of screen when overloaded. No comment is necessary.

Fig. 7 shows that the wooden screen allows much more small straw to pass than the GRAEPEL, which makes cleaning more difficult.

In résumé, the GRAEPEL system has the following technical and economic advantages :—

- (1) Higher yield of grain.
- (2) Reduced costs of repair of the shaker.

- (3) Facilitated cleaning of the mixture of grain and small straw collected.
- (4) The nails securing wooden slats may work loose and get mixed with the straw which is used for fodder. This serious drawback is completely eliminated by the use of metal slats in the GRAEPEL screen.

Publications consulted :

- (1) VORMFELDE, Die Entwicklung der Motordreschmaschine. — *Mitteilungen der D. L. G.*, 29, Berlin 1926.
- (2) VORMFELDE & VON SYBEL, Leistungen und Verluste eines Mähdreschers. — *Die Technik in der Landwirtschaft*, Nr. 5, Berlin 1929.
- (3) DAHRENMÖLLER, Neue Untersuchungsmethode der Arbeit eines Strohschüttlers in Dreschmaschinen an Graepels Schüttler — Versuchsmaschine — *Landmaschinen-Markt*, Heft 38, Pörsneck 1930.

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Notes.

INTERNATIONAL YEARBOOK OF AGRICULTURAL ENGINEERING. — The 2nd edition of our *List of Institutes and Research Stations dealing with Agricultural Engineering* is nearly exhausted. As a result of the number of encouraging letters we have received we have decided to publish under the new title, *The International Yearbook of Agricultural Engineering*, an enlarged 3rd edition with the following alterations.

Additional information will be introduced concerning: — National centres of agricultural engineering — Central Syndicates — Experimental stations — Commissions — Societies — Museums — Exhibitions — Special periodicals — Statistics of agricultural machinery in different countries.

The information about Institutes, Professorships and Research Stations will be increased.

The list of technical terms (appendix) will be simplified.

The use of the five languages — French, English, German, Italian, Spanish — and the geographical order of countries will be continued.

H. J. H.

ANIMAL HUSBANDRY

An Application of the Principles of Scientific Management to Milk Production.

It is considerably more difficult to apply TAYLOR's principles for scientific management in agriculture than in industry. The difficulties are particularly great in the stock farming branch, where the elements are living and mobile creatures which do not lend themselves readily to systematic mechanical methods. For these reasons experiments in this direction are of particular interest from a technical standpoint even if economic conditions do not allow of the practical application of the results.

In the course of a recent study tour in the United States the writer visited a New Jersey dairy farm in which an attempt is being made to apply modern scientific ideas in the greatest possible measure, particularly in so far as they allow of labour saving. This farm, the Walker Gordon Dairy Farm of Plainsboro, prepares mainly certified milk and acidophilus milk.

Although this enterprise is organised on an ideal system the various processes present no other feature essentially novel, hence we shall confine ourselves to describing the milking system, which is a genuine innovation in the organization of dairy farming.

Milking cows in special buildings separated from the ordinary cowsheds is a recent innovation but has already been introduced into a certain number of farms. It

makes it possible to omit part of the mechanical milking plant and to obtain very pure milk which has not been in contact with the impure atmosphere of the cowshed.

On the Walker Gordon Farm the cows are milked in a centrally situated building which is equipped with a special installation called a "Rotolaktor" produced by the De Leval Separator Company. The essential feature of the Rotolaktor is a rotating platform on which stanchions for fifty cows are radially arranged. Each

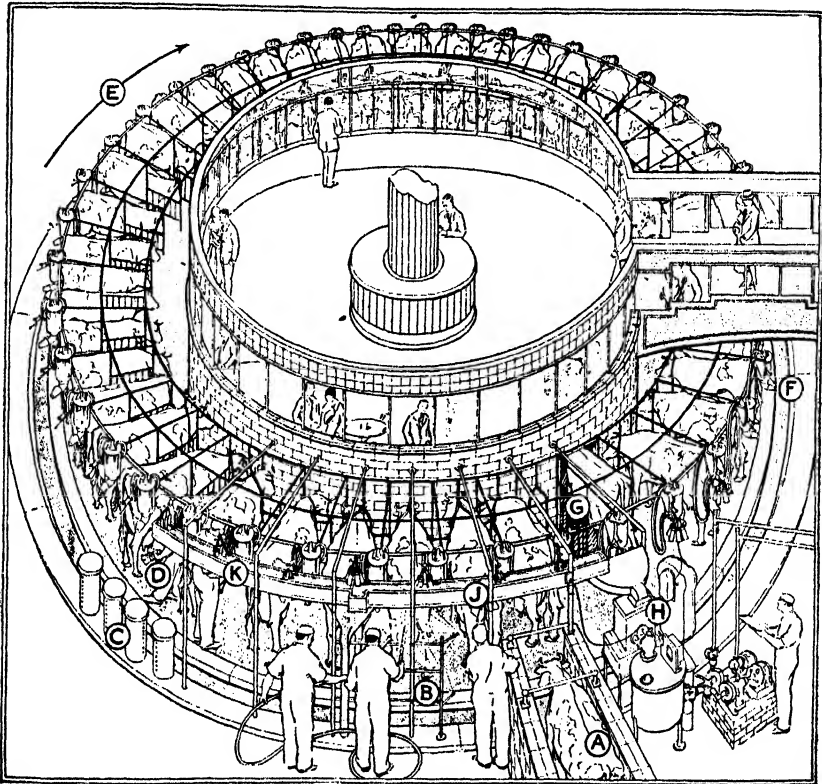


FIG. 1. — Diagram showing the working of the "Rotolaktor".

stanchion is fitted with a modern milking machine with a glass receptacle for the milk. The platform revolves continuously at a speed which at the periphery is 15 feet a minute and completes a revolution in 12 $\frac{1}{2}$ minutes.

The cows enter by a passage which opens on to the platform (see fig. 1, A) and pass at quarter minute intervals on to the revolving platform. As soon as the cow has entered a stanchion an iron halter automatically encloses its neck so that it cannot retreat. The movement of the platform carries the cow first in front of a spraying apparatus (B) which washes its hindquarters with warm water. This automatic washing is supplemented by hand hosing and then the cow passes in front of an operator who wipes it with sterile cloths while a current of hot air (C) completes the drying process. The next operator draws a sample of milk from each teat to ascertain that the udder is healthy, then another attaches the milking machine (D) which works for

about $8\frac{1}{2}$ minutes (E) at the end of which the cow has nearly completed the revolution, and arrives in front of the operator who detaches the teat-cups of the milking machine and hangs them on a lever. The stanchion then arrives before an opening into the inner enclosure, the halter automatically opens and the liberated cow passes into an underground passage which leads back to the cowshed. The receptacle containing the milk of the cow which has just left the platform is carried before an automatic weighing device (H) where it is automatically levered open ; the milk is weighed and then pumped into the cool chamber without having come into contact with the outside air.

While the cow is being washed and dried on the platform of the Rotolaktor a special apparatus cleans the milking machine. The lever on which are suspended the teat-cups just removed from the cow which has been milked plunges them into a trough (F) containing cold water. The water is drawn in and the machine is thoroughly rinsed. The cups are lifted again by the lever into another trough (K) where

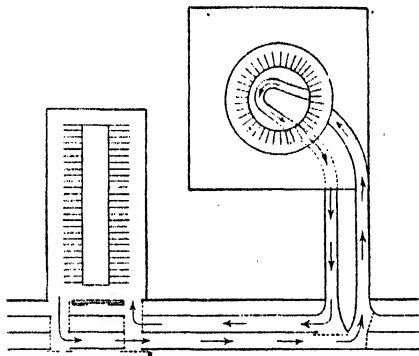


FIG. 2. Diagram showing the route taken by the cows (indicated by arrows) between the shed (on left) and the "Rotolaktor" (on right).

hot water is drawn in and sterilizes the whole machine. Then after being cooled by water in a third trough the machine is ready to be attached to the next cow, which has been washed and dried like the last.

Thus every quarter of a minute a fresh cow steps on to the platform of the Rotolaktor, which can carry 240 cows an hour. The farm in question has 1,500 dairy cows, which are thus milked in about seven hours. After milking the cleaning of the stalls and the machinery takes an hour. The operation is immediately started again and is continued almost without interruption, so that all the cows are milked three times in the twenty-four hours.

Each shed stables fifty cows and is connected to the Rotolaktor by a passage divided by iron railings into two parallel gangways, one leading to the milking platform the other for the return to the shed (fig. 2). These passages are opened or closed according to the direction the cows are to take, so it is necessary only to start them on their way and they will follow the route by themselves. This walking to and fro gives the cows the exercise they need, because the cows in milk are never out to grass or in any enclosure outside their shed. There is thus a continuous circulation of cows through the passages day and night. They quickly learn the routine so that it is seldom necessary to drive them on.

The greatest advantage of the Rotolaktor is clearly the reduction of labour. The

Walker Gordon farm has reduced its workmen by 60 since the system was adopted. To wash and milk three times daily the 1,500 cows of the farm three gangs of nine men working eight hours at a stretch are required. One man controls the entry of the cows on to the platform of the Rotolaktor, two men are responsible for the supplementary washing by hand, a fourth dries the cow, a fifth takes a sample of the milk from each teat, two others attach the milking machine and the eighth removes it. The ninth man keeps a record for each cow of the quantity of milk indicated by the weighing machine.

Apart from the economy of labour, the work of the few men required is distributed and specialised and, therefore, is better done.

The milk having had no contact with the air remains sterile without the necessity of pasteurization or sterilization.

The future will show whether the new system is an economically practical proposition for milk production in general. The experience of the Walker Gordon Farm cannot be regarded as conclusive because, although the Rotolaktor is already paying its way, its success has resulted from extensive advertising as well as from the desire of the public for a reliable milk. From a purely technical point of view, however, the new system seems of sufficient interest to merit description.

. S. TAUSSIG.

Notes.

Alimentation.

THE USE OF ASPHALT AS AN IMPERMEABLE LINING FOR ENSILAGE PITS. — The German Agricultural Society (D. L. G.) has tested a process by which ensilage can be made in pits dug in light earth without any brickwork, the latter being replaced by an asphalt lining, "Timeroid", which is airtight. This method of making ensilage has proved practicable, but unfortunately, in its present form, the asphalt lining is not strong enough to be used many times in succession as it tears easily. This increases the cost which, in the case of Timeroid, is already 2.40 marks per cubic metre of pit — that is, about 25 pfennig a quintal of potato ensilage.

Horses.

HORSE JUDGING IN BELGIUM. — Belgian horse-breeders met in Brussels on August 27th 1930 at the Ministry of Agriculture, with a view to introducing greater uniformity into the judging methods of the expert judging committees. They adopted the following conclusions:—

(1) To recontinue the methods which had been suspended a year ago, and to endeavour to arrive at a still greater uniformity.

(2) To adopt the following order for the examination of stallions:—

(a) three-year-olds;

(b) for the four-year-olds and over to begin with the youngest and those to which no prize has previously been awarded and to keep until the end those which have been awarded a conservation prize.

(3) To award neither a provincial prize nor a prize of conservation to any stallion whose paces are not correct and easy.

(4) To disallow in future, the excessive excitation of horses during the trot, and therefore to forbid the use of more than two whips — one for exciting the animal and the other for control when necessary.

(5) To allow neither the surcingle nor girth during judging or racing.

(6) To refuse to judge any horse which shows signs of any artificial colouring.

(7) To postpone until such time as it shall be possible to apply it in all provinces — i. e. in 1931 — the enforcement of that article of the regulations which provides that in order to remain eligible for the conservation prize, horses of 8 years old and over must have proved themselves good breeders.

BUDGET OF THE PRUSSIAN BREEDING STUD ADMINISTRATION FOR 1931. — The State subsidy for Breeding Studs this year is only 8,565,462 RM (in comparison with 9,705,654

RM in 1930 and 10,574,308 RM in 1929). It has been found possible to reduce the expenses by completely suppressing the Beberbeck stud, by reducing the number of brood mares at Graditz by 20, and by dismissing a large number of the staff.

At present the number of horses is as follows:— 23 stallions in the principal studs (as in 1930); 340 brood mares; 1055 young stallions (1150 in 1930) in the 3 chief studs and in the 15 rural studs; 2113 stallions in the remount stations (as in 1930) and 300 young stallions in the stallion stud at Hunnesrück.

The total area of the 3 principal studs is 8002 ha., of which the Trakehnen Stud alone comprises 6058 ha. (2865 ha. of fields and 2510 ha. of meadows and pasture land). (From the *Berliner Tierärztliche Wochenschrift*, 1930).

THE NEW STATE STUDS IN FINLAND. — The Finnish government proposes to form a new stud at Ypäjä for the purpose of breeding a light riding horse suitable both for the cavalry and for other purposes, and also a type of farm horse. The cost has been calculated at 5.8 million Finnish marks, of which 624,000 marks will be used for the acquisition of breeding stock. This stud is to consist of 100 mares and a corresponding number of stallions.

THE NUMBER OF CERTIFIED STALLIONS IN ENGLAND AND WALES FROM 1923-29. — The number of stallions which have been certified in conformity with the 1918 law concerning horse breeding is given in the following table, which shows the present trend of horse-breeding in England.

Types of horses	1922	1924	1926	1928	1929
Shires	2,174	1,195	820	720	560
Other heavy horses	501	424	324	313	329
Light horses (including ponies)	714	591	455	381	347
Totals	3,479	2,210	1,608	1,414	1,236

In 1929, 22 more service permits were issued than in 1928. The breeding of light horses is decreasing much more rapidly than that of heavy horses. The latter even increased slightly from 1928-29, the increase in shire horses being from 720-760, and of other heavy horses from 313-329 (Clydesdales from 120-133, Percherons from 38-41, Suffolks a diminution of 18). Among light horses the number of Hackneys has diminished by 18 and of Welshes by 13, but there has been a slight increase in Thoroughbreds (from 164-166).

THE GREAT RIDE OF COUNTRY HORSEMEN ACROSS GERMANY IN 1930. — This ride, organized by the German Society of Horsemanship for purposes of propaganda in favour of the society and of horse breeding, covered a total distance of 5000 km. It was divided into 6 routes which connected the most remote parts of Germany, and lasted, both day and night, from December 6-12. There were about 50,000 participants. (From the *Sankt Georg Sportzeitung*, 1930).

THE PURCHASE OF STALLIONS IN EAST PRUSSIA FOR THE U. S. S. R. — Since February 1929, the commercial delegate of the U. S. S. R. at Berlin has made these purchases very regularly and has sent to Russia the following number of stallions:— in 1929: 50 in February, 30 in May, 15 in December — in 1930: 33 in July, 22 in December — total 150.

The East Prussian Stud Book Society is attempting to make arrangements with Russia for the supply of stallions for at least 2-3 years but the negotiations have not, as yet, resulted in any definite arrangements.

Cattle.

A HERD BOOK FOR THE ROMAGNA CATTLE, ITALY. — The Italian Ministry of Agriculture has nominated a commission to draw up proposals concerning:—

(1) The establishment of a standard for the Romagna cattle breed and for a chart of points.

(2) The maintenance of a herd book for the breed and the drawing up of a schedule for the entering of authorized animals.

(3) The opening of a competition between the provinces of Ravenna and Forlì for the "targa d'oro" offered by the Ministry.

NEW HUNGARIAN REGULATIONS CONCERNING INSCRIPTION IN THE CATTLE HERD BOOK. — Up to the present the Hungarian Herd Book commission (O. T. B.) has allowed the inscription of only such cows as have been submitted to milk production control. Unfortunately, among the small farmers in many districts, this control is impossible owing to practical difficulties. It is, however, only fair that these farmers should also enjoy the advantages of the herd book. The above commission has therefore decided that, in exceptional cases, in which insuperable difficulties stand in the way of milk control, the qualifications necessary for inscription will be confined to external features.

The provisions regulating this exceptional inscription specify that it can only be carried out in favour of farmers who possess fewer than 10 cows. In judging cows which are to be inscribed without milk control, the type and character of the milk should be estimated by a greater number of points. After their inscription the cows are under the control of the control officers who must note any change in head of stock, births, etc., and must also give advice on feeding, riding, etc. In the rural communes where these exceptional inscriptions are made, general breeding can only be carried on with bulls whose pedigrees are perfect both as regards the milking capacities of their female ancestors and in all other particulars.

AGRICULTURAL INDUSTRIES

Notes.

MODERN PROCESSES FOR THE MECHANICAL EXTRACTION OF CITRUS ESSENCES. — Dr. LA FACE (Director of the "Regia Stazione Sperimentale per l'Industria delle Essenze e dei Derivati dagli Agrumi", Reggio Calabria) has collected and published up-to-date information about machine methods of extracting the essence of lemons and other citrus fruits in Italy. He notes also the influence of the various processes on the quality of the essence and its net cost of production.

Since 1914, when the first modern machine appeared, considerable progress has been achieved. At the present time only about half the essence produced in Italy is obtained by the hand ('sponge') method.

1. *Mechanical processes without pressure.* — These may be subdivided into two classes according to whether they use the rind only or the whole fruit.

(1) In the old method of extracting the essence from the rind by hand ('sfumatura') the most delicate operation, on which the industrial success of the process depends, is the pressing out of the essence, which requires much skilled labour. Now this operation is effected by the LO CASTRO and CIANCIOLO machines; in the former (fig. 1) the rind is pressed between two plates containing sponge which absorbs the liquid extract; in the second (fig. 2) the rind passes between two rollers, one of which is provided with teeth to break the oil glands, and the essence is removed by a jet of water.

The extracted essence is very similar in nature and quality to that obtained by the hand method and is of excellent quality. — Quantity of lemons treated per hour: 3.5 quintals — Cost: 3.32 liras per quintal.

(2) The second group includes the following machines which use the whole fruit: "Calabrese", VINCI, AVENA, CANNAVÒ, "Speciale" and GANGERI.

The "Calabrese" machine (fig. 3). — This was invented in 1840 and is the oldest type of machine; it consists essentially of two cups, the lower one fixed and provided with teeth (for lemons) or small blades (for bergamots), the upper fitted to a moveable vertical axis. The essence obtained is excellent but the yield is low. This machine is constructed for spherical fruit and is not well adapted for extracting oval fruits.

In the VINCI machine (fig. 4) the fruits pass under water between a pulley and a flexible band of steel combs in chain form which takes the shape of the fruit and lacerates the rind liberating the essence into the water. Before being carried away the fruit passes into a box fitted with sponge which absorbs any essence remaining in the rind. The essence obtained is satisfactory in quality. Output of machine: 4 quintals of lemons per hour — Cost: 2.28 liras per quintal of lemons treated.

In the AVENA machine (fig. 5) the fruit falls from a hopper on to one or more glass or metal rotating toothed plates and is driven by centrifugal force against a grating surface. The oil glands are thus broken and the essence is carried off by a jet of water directed on to the fruit. The best essence is obtained with the machine with glass plates. — Output: 8 quintals of lemons per hour. — Cost: 1.10 liras per quintal.

The CANNAVÒ machine (fig. 6) consists essentially of two bell-shaped cylinders toothed on the inside and turning in opposite directions. A jet of water pours on to

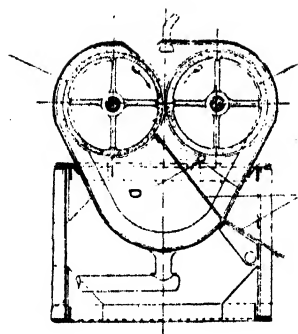


FIG. 1. — I.O CASTRO Machine.

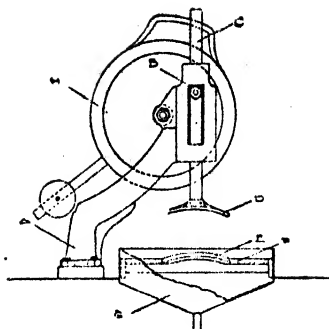


FIG. 2. — CIANCIOLO Machine.

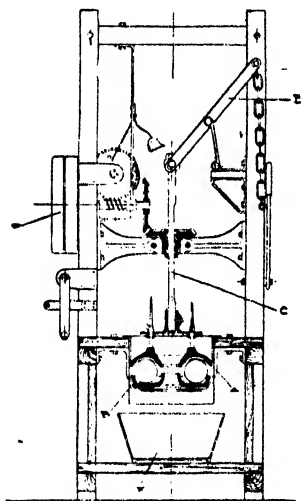


FIG. 3. — "Calabrese" Machine.

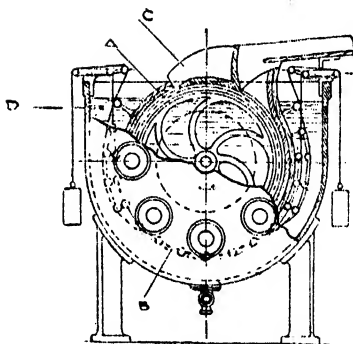


FIG. 4. — VINCI Machine.

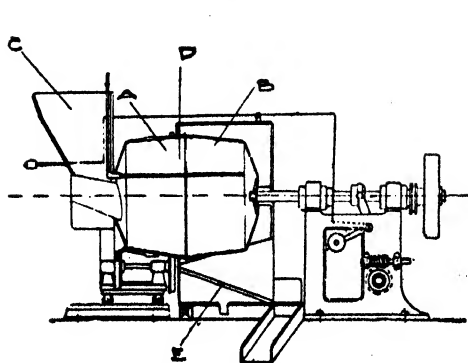


FIG. 5. — AVENA Machine.

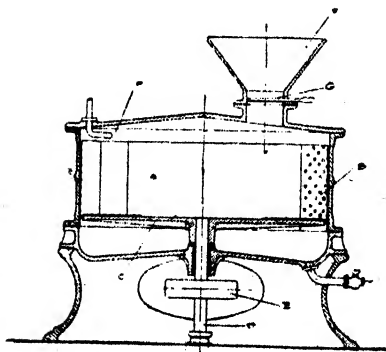


FIG. 6. — CANNAVÒ Machine.

the fruit and carries off the essence while the epidermis is being lacerated. The operation is ended in 2 or 3 minutes, the jars open apart and the fruit is carried away. This machine is much used because of its high industrial yield but the essence produced is poor in citrol, highly coloured and with a high resin content. — Output : 14 quintals of lemons per hour — Cost : 0.78 liras per quintal.

The "Speciale" machine (fig. 7). — This is the latest type of machine (1928). It is widely used on account of its high yield. The lemons are distributed mechanically into two adjacent chambers (A and B) the bottom and sides of which are furnished with points. The bottom of each chamber is formed by two rollers turning in the same direction which drive the fruit against the walls of a moving diaphragm which lacerates the rind. The quality of the essence differs little from that obtained with the CANNAVO machine — Output : 14 quintals of lemons per hour — Cost : 0.95 liras per quintal.

Output of the various machines and quality of the essence obtained. — The lowest output and the best essence, differing least from that obtained by hand, are given by the "Calabrese" machine, which being intended for spherical fruit is not adapted to fruit of irregular shape. Next in order come the VINCI and AVENA (model with graters of glass) machines, which are not suitable for soft or overripe fruit. The other machines : — CANNAVO, "Speciale" and AVENA (model with metal graters), give a higher yield at lower cost and are preferred in the trade, but the essence is of inferior quality. The essences extracted by the "Calabrese", CIANCIOLO and AVENA (glass graters) machines obtain the highest prices on the market after the hand extracted essence.

II. *Mechanical processes with pressure.* — In the PERATONER and BENNET processes the fruits are cut up and pressed, the greater part of the liberated essence passes into the juice and is separated by distillation in vacuo (PERATONER) or by centrifuging (BENNET).

The characteristics of the essence obtained by the BENNET process are very similar to those of the essences obtained by the CIANCIOLO and AVENA (glass) machines ; the PERATONER essence although good, has a different perfume from the hand extracted ('sponge') essence and a lower percentage of citral. (Dr. F. LA FACE, *Bollettino Ufficiale della Regia Stazione Sperimentale per l'Industria delle essenze e dei derivati dagli agrumi in Reggio Calabria*, 1930, no. 7, 8, 9 e 12).

PECTIN FROM BERGAMOTS. — The results of recent research by Prof. ROMEO (Reggio Calabria) show that from bergamot waste ("pastaccio") hitherto regarded as valueless, large quantities of excellent commercial pectin may be obtained. The product is similar to that obtained from oranges and gives a clear firm jelly. (*Bollettino Ufficiale della R. Stazione sperimentale di Reggio Calabria*, 1930, No. 12).

ESSENTIAL OIL AND FAT FROM THE LAUREL. — *Laurus nobilis* occupies an important place in the medicinal plant industry. It is a hardy shrub, used also as an ornamental plant ; the most productive plants are grafted with *L. nobilis pallidus*. The ripe berries are gathered in October and November.

Essential oil. — The essence extracted from fresh (yield = 1 %) and dried (yield = 3 %) leaves has been known from ancient times as a valuable disinfectant (it contains about 45 % eucalyptol, 18 % terpineol and geraniol and other terpenes) and as a solvent etc. in chest affections. The insecticidal properties of the essence make it useful when mixed with grease as an ointment for animals. Mixed with essence of carnation, cinnamon, etc. it forms pleasantly scented disinfectants which are valued highly in the soap industry.

Fat ("Laurel butter"). — The "Società del Garda" (Italy) extracts laurel butter by steaming the fresh berries for 10 or 12 hours. About 10 % of fat is obtained which is purified and stored in glazed earthenware receptacles. The residues form a pulp which can be used as feed for horses and cattle, or treated with solvents will still yield about 6 % of fat.

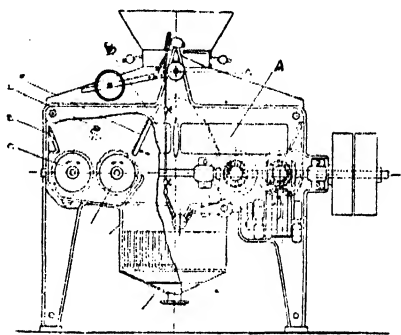


FIG. 7. — "Speciale" Machine.

The principal elements of the fat are melissyl alcohol, melissic acid, trilaurine and laurinic acid, trimyristicine, tripalmitine, etc.

Soaps made from laurel butter and olive oil (Laurolive) and from laurel butter, olive oil and palm oil are excellent for the skin.

Laurel fat has an inhibitory action on the lipolytic ferments contained in the different oils. It is thus useful to mix (at about 10 %) with various oils for wool. (*Essenze e Profumi*, Milano, 1930).

G. S.

BOOK REVIEWS *

General Agronomy.

WILLCOX, O. W., *Principles of agrobiology, or the laws of plant growth in relation to crop production*. Palmer Publishing Corporation, Inc., New York, 1930, 96 pp., ill.

[In the Introduction the author explains agrobiology as the science occupying an intermediate position between plant physiology, which deals with the metabolic phases of plant life, and agronomy, which is concerned chiefly with the economic phases of crop production. The province of the agrobiologist is that division of agricultural science which considers the general external relations of crop plants to their environments, and their mass reactions as distinct from their individual reactions to growth factors. Agrobiologic questions are all founded on the unit of land surface, the concentration of external growth factors and the inherent growth power of the plant species.]

Part I of the book deals with the ten primary laws of agrobiology, which express how plants respond to the stimulus of "growth factors" under the limitations of space. These laws are the recognised bases of agricultural science, stated with mathematical precision. The growth factors are light, heat, CO₂, water and the chemical elements of soil fertility (N, P₂O₅, K₂O, Ca, etc.). The operation of these laws is illustrated by examples taken from the data of large scale farming operations and investigations, free use being made of graphs and diagrams. In these examples tropical agriculture is represented mainly by the sugar cane, and temperate zone agriculture mainly by the sugar beet.

Part II deals with the general law of growth factors and its derivatives. The general law, deduced from the primary laws and established by experiment, was first stated by MITSCHERLICH. It is expressed as an equation which says that the amount by which the yield (y) is increased by regularly increased increments of a growth factor (x) is proportional to the difference between the maximum yield (A) which could be obtained by increasing x and y at any given stage of increase, i. e. $\text{Log}(A-y) = \text{Log}A - c.x$, where c is a factor of proportionality.

The precision with which, for example, application of fertilisers in large scale farming can be correlated by this means with expected yields is shown in graphs obtained from experiments in Hawaiian sugar plantations.

The general law leads *inter alia* to the recognition of the limits to the effect of growth factors, and the existence of such limits determines the characteristics of the perfect environment for growing crops. The latter is proved to be one in which the soil contains not less than 25 quintals per hectare of N, 5 qu. per ha. of P₂O₅ and 3.5 qu. per ha. of K₂O and equally definite and ascertainable maxima of all other growth factors.

The purpose of the book is to acquaint the student and practical agriculturist with the basic principles by which crop plants in massed colonies occupying definite areas may be enabled to attain maximum development. It provides, in other words, for the first time a basis for a genuinely scientific agriculture depending on a coordination of the knowledge of the laws of plant growth in relation to the unit area of land surface].

A. M. F.

Tropical Agriculture.

ZIMMERMANN A. *Die Gerbindenliefernden Akazien (Wattle-Bäume)*. Kultur Gewinnung, Verwendung und Handel. Verlag: Gustav Fischer, Jena, 1930, pp. VIII-146. litt. 6 pp. Price: Rmk. 8, bound: 9.50.

[Prof. ZIMMERMANN in this book on tannin-producing Acacias has provided tropical and subtropical agriculture with a useful book on a subject that lacked a comprehensive treatise. In the 1927 session of the C. I. S. A. HEIM DE BALSAC proposed the publication of a monograph on plants containing tannin and their products and his proposal was accepted by the tropical division. A great mass of literature exists on the subject

* Under this heading short synopses are given of books sent for review.

but it is very scattered, as may be seen from the list of literature given by ZIMMERMANN which contains 223 references, of which 132 are in English, 49 in German and 32 in French. This book will serve a most useful purpose.

The contents are divided into 16 chapters. The first two deal with the Acacias which are of more or less importance and with climate and soil. Culture is discussed in chapter III and full information and figures are given concerning experiments made in different parts of the world. The following three chapters deal with harvesting, preparation of the bark and of extracts. In the seventh chapter a complete list of pests and diseases is given, some of which are discussed more in detail. The chemistry of bark and extracts is discussed in chapter VIII, and the tenth chapter gives information on by-products. Complete statistics are given, and in the twelfth chapter the productivity of Acacias in different countries is discussed. Chapter XIII and XIV give information on cost of production and market prices.

In discussing the prospects of the culture of Acacias Prof. ZIMMERMANN remarks that where climate or soil, labour supply or transportation facilities show weak points, it would not be advisable to start acacia plantation. Acacia bark and extract have to compete with other tanning materials, and in this connection it is of importance that Quebracho production in South America is diminishing. The same is true in regard to North American materials, *e. g.*, oak and fir, and materials of Mediterranean origin, *e. g.*, oak and chestnut. Also the exploitation of Australian wattle forests will not last long. It is therefore to be expected that prices of tanning materials will improve and this may lead to a more intensive exploitation of tropical mangrove forests. The importance of these however is often over estimated.

But even when prices improve they will always be low, in comparison with other tropical products and it is therefore necessary that tanning materials should be prepared as cheaply as possible and by simple processes].

M. B. S.

KERMANS H. et LATIERE A., *Le café*.

[A subscription list has been opened for this book, which will be published at 250 fr. a volume. Subscriptions should be addressed to Avenue d'Amérique 62, Antwerp, Belgium. The book will be a useful guide to coffee planters and merchants and all interested in coffee. It will be fully illustrated].

J. L.

FORESTRY

Integral reclamation schemes for mountainous areas in the Mediterranean basin, with particular reference to Italy. (Part 1).

The work of integral land reclamation, which is increasingly becoming a matter of great urgency for several of the countries in the Mediterranean basin where mountainous conditions prevail, has already made good progress in Italy. This Review has in a previous number already given an account of this work with special reference to its effects on the agriculture of the plain lands (1).

It appears to be desirable to supplement the statement already published on this subject by some account of the special function and place in the general scheme of reclamation work, also integral in character, carried out in mountain areas.

For purposes of continuity it is necessary to refer briefly to the past history of a not very distant epoch.

In mountainous countries the safeguarding of the agriculture of the plain lands, through regulation and reclamation on sound lines of the neighbouring mountain system, has at different times been made the object of legislative intervention and has also influenced the State to take direct action.

In Italy however there has been no previous direct consideration of the true productive capacities of the area so that there has been a tendency for political

(1) See COSTANZO G. *Monthly Bulletin of Agricultural Economics and Sociology*, International Review of Agriculture, Rome 1929, No. 4, pp. 170-176.

theories to impose general limitations on State intervention in the field of agricultural production, and the more general aspects of reclamation work have been to some degree ignored. These political theories have exercised a predominant influence and led to a one-sided form of legislation, the object of which was to correct the unsatisfactory land and water conditions of the mountain area and to lessen their effects upon the plain, while limiting the possibilities of utilising these mountain lands or only carrying out certain specific work, or in other words confining attention to certain technical aspects of the problem.

This almost mechanical limitation of intervention was accompanied by a very scanty knowledge of the special economic problems prevailing in the areas in question. In this way the measures taken were very imperfectly adapted to the diversity of local requirements, which remained always fundamentally economic in character and therefore were specially in need of treatment on economic lines.

Practically there was little or no continuous attempt to discover how mountain lands at different altitudes could be utilised to best advantage. At the same time an examination of this question was really quite indispensable for giving proper effect to any scheme of general improvement in the yielding capacity of mountain lands as also for the proper co-ordination with land improvement schemes, of which the special object was the protection of the plain lands.

This lack of consideration for the economic aspects was also to be observed in the general scheme for drainage work on the plain lands, the object of which was mainly to check as far as possible the risks of flooding or merely to carry out such fundamental improvement work as would make marshy and unwholesome lands fit for habitation or facilitate the construction of a certain number of roads of particular importance for large properties devoted to extensive cultivation.

For a long period intervention for the purpose of land reclamation and improvement was not considered as being concerned with the difficulties that would immediately arise after the completion of the particular scheme of work, that is to say the part that must necessarily be taken by the action of private individuals in areas that had been reclaimed. When at a later stage it began to be understood that it was necessary to assist such action, the consequential legislation found itself caught in a veritable labyrinth of diverse technical problems so that in practice, in giving effect to the legislative measures themselves, those very economic requirements in which they had originated tended to become obscured.

The chief obstacle was always the theory that the State was not properly qualified to intervene in questions of agricultural production except by way of indirect assistance on the technical side.

Meanwhile, in the most favourably situated and most naturally fertile areas the need for the establishment of organisations taking a quite different point of view began to grow up.

The State did not appreciate sufficiently the true value of this attitude. The spirit of speculation giving quick results, which for some time controlled the investments of capital in agricultural improvement schemes, was prejudicial to the subsequent development. Then followed certain historic events bringing strong political and social pressure to bear on the Governments of the day and this pressure in the end brought about a complete reversal of the fundamental conceptions of State responsibility.

The theories of the present regime have rapidly and profoundly modified the character of all forms of State intervention, rendering them "totalitarian", *i. e.*, in a true sense comprehensive, where questions of public interest are concerned.

These principles have brought about the study of the problem of a complete

transformation of agriculture within certain economic limits for the State territory as a whole.

The desirability of immediately putting in hand a general plan has been brought before the public as an urgent national necessity which takes the form, as regards the present generation, of finding the means which will make it possible to face all the problems of the continuous development of the country.

The accomplishment of this purpose, which is of high social significance, would moreover provide a signal contribution towards bringing back the people to agricultural work, for which the race is naturally particularly well adapted and which in more happy periods of its history has proved the surest source of a lasting prosperity.

The " totalitarian " character of the State action does not by any means signify that it should take the place of private enterprise ; rather is it necessary, in order to make it possible for the State to fulfil its complete responsibilities in relation to private initiative which itself requires to be controlled and directed so that the purposes of public utility may be realised with due regard to sound economic principles. Hence this characteristic determines the extent and far-reaching nature of State responsibility, which should always aim at encouraging private initiative by the preliminary preparation of the field in which it is to be developed and by giving technical advice and subventions.

In order to secure the full realisation of the purposes in view with all their high national importance, the State naturally has the right to intervene in the matter of private enterprise, when the latter works in a manner that is unlikely to fulfil the end desired on lands that have been previously prepared for agriculture at the State expense. As regards financial assistance, this is granted by the State under guarantees satisfactory, both from the technical and economic standpoints, to all parties undertaking to carry out land improvement and development as also to those that contribute to the increase of agricultural production by introducing modifications into the processes actually employed.

In this way, acting quite independently of those distracting influences which as a rule go along with the details of practical execution, the State efforts, whether they take the form of direction or assistance, are always based on principles that are both economic and social. These principles are laid down after the previous consideration of a definite possibility of obtaining favourable results in some definite field by the use of the most economically satisfactory means.

The work of preparation for land development where private initiative cannot conveniently act directly, and also the regulation of the upper watersheds remain the responsibility of the State. But inasmuch as it is desired to extend the general control of land development schemes to mountain areas this responsibility will be carried out always with the intention of assisting at the same time the proper utilisation of the land. This course is necessary in order that changes may be brought about in the old ways of utilising a mountain area so as to bring it into line with the general scheme of economic development.

To the mountain area there is also applied the theory, in accordance with which land transformation and cognate work must be carried out by the means which, among those which can bring about a transformation in fundamental conditions or processes of production already existing into something different but better adapted for the increase of production, are the most economically sound.

The proper appreciation of the true economic value of the means adopted should be taken as a determining factor as regards the limits of any scheme and a way of securing its proper co-ordination. In practice this has always been a very difficult

matter but the new corporative constitution of the State now tends to facilitate frequent and useful co-operative action and this in many cases is a helpful factor, particularly important when dealing with mountain problems. All enterprise of this kind should be entirely free from any spirit of speculation and really be transformed into a form of general co-operation in which minor undertakings will find their proper place, seeing that work carried out in the national interest requires from all both personal and general sacrifice superior to such considerations.

The general principles, which have been briefly described above, may be said to date from 1923 and the later work of the Government since that time to the present shows how very carefully the work of preparation for carrying out the scheme of general land reclamation which covers all districts has been performed.

Legislative and administrative reform and modifications in technical equipment and financial organisation would seem to be necessary in the first instance and it is intended that they shall be continued. Thus legislation relating to public works and to corporative societies has been made subject to far-reaching modifications.

Since the regulation and reclamation of the mountain side is considered as an essential preliminary condition for the drainage and improvement of the plain lands, special consideration has been devoted to the financial aspect of this branch of the work. The wide extent and political importance of any enterprise of this character have made it necessary to set up a central body for the general control of all land improvement schemes and works, this body being placed under the direct charge of a Member of the Government. (See Royal Decree of 12 September 1929, No. 1661).

Away from the centre this body makes use of the assistance of competent technical bureaux, either regional or provincial. In turn to these bureaux special duties are assigned, but their main action consists in carrying out comprehensive schemes, first considered and worked out by themselves and afterwards approved by the Central body.

In connection with the protection and development of the forests, with the improvement of grazing areas and also with the regulation of the lands and waters of mountain districts, the Government in 1926 had already established a specialised military organisation known as the National Forestry Militia, which is also made responsible for carrying out the integral improvement scheme for the mountains.

This land reclamation work requires a permanent condition of local balance between lands and waters, representing at the same time a full utilisation of the mountain and the proper protection of the plain by means of drainage works, etc. The possibility of making an extended or improved use of the land resources of the mountain should not be in any way diminished by the absolute necessity for maintaining this balanced condition and should be solely conditioned by the consideration of the utilisation of the land for forms of cultivation in which full account is taken of this requirement.

The case of a mountain area is the one in which the choice of the means that are the most economically satisfactory becomes peculiarly difficult and subordinate to the actually prevailing conditions. It may be asked, always having regard to the necessity referred to, what are the present conditions prevailing in those mountain areas to which the scheme of integral land improvement should be applied?

Italy, which may properly be considered as typical of the average general conditions prevalent in the Mediterranean area as regards its mountains, has for a

long time utilised methods of production which are by no means really suitable to the local possibilities of the land. This fact, aggravated by uneconomical forms of management and by practices which are opposed to all sound rules of agriculture or forestry, has brought about unsatisfactory conditions regarding lands and waters on a very wide scale. In order to modify these conditions, State action in the past could find no other means of checking the mischief than by limiting exploitation and direct intervention, without sufficient care for the re-establishment of economic continuity in the kinds of work encouraged.

In 1923 the Government began to consolidate in a single text the various legislative measures relating to forests and mountain lands and to render them more elastic. The limitation of the utilisation of the lands was no longer made solely dependent on their position as regards the lands and waters system, but on any form of utilisation opposed to the general interest. The landowner may himself propose the system which he intends to follow in the management of his estate and the law only indicates methods of carrying out simple drainage schemes for cultivated mountain land. At the same time the action to be taken with regard to the increase of the area under forest has been developed and private owners are obliged to conform to the usual rules of felling which secure regeneration at the same time. These rules must gradually take the place of special schemes for forest management in the case of forests belonging to communes and public institutions. In the sphere of the promotion of reafforestation work the amount of financial assistance allowed has been considerably increased and premiums also awarded for the more important schemes. The improvement of the pasture area has at the same time been encouraged extensively both by grants in aid and technical advice.

Technical assistance for private individuals, the preparation of management schemes for forests belonging to public institutions, the preparation and carrying out of schemes for the regulation and control of mountain watersheds are questions for which the officers of the Forestry Militia are made responsible.

Thanks to the economic elements it contains, the application of which will be very carefully controlled and directed, the law has already become a very potent instrument for improving conditions in mountain areas.

As the general law for land improvement provides that the State can intervene in any district whatever, where the progress of agriculture is checked as the result of unsatisfactory physical and social conditions, it provides an excellent basis for truly constructive work.

As regards the application to mountain areas of the principle of a "compenso", or general scheme for the development of an area, which is already operating in the plains, certain special questions arise, which will be treated in a later article.

(Continued).

S. CABIANCA.

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MONTHLY BULLETIN

OF

AGRICULTURAL SCIENCE AND PRACTICE

GENERAL AGRONOMY

Notes.

I. — GENERAL AGRONOMY.

Meteorology.

SCIROCCO INVASIONS OF CENTRAL EUROPE. — According to Martin HERRMANN, who has published a study of the question (*Scirocco-Einbrüche in Mitteleuropa. Veröffentlichungen des Geophysischen Instituts der Universität Leipzig, 2. Reihe von speziellen Arbeiten, Band 4, p. 181-252*), it is not unusual for tropical air from the Sahara to pass over Central Europe; there are various evidences of this, in particular the occasional falls of Sahara dust. Though this air is dry for its high temperature, the absolute humidity is high enough to cause heavy warm rains and even for thunderstorms, particularly in the valley of the Po (Italy) and in a more moderate degree in other parts of Central Europe.

RAINFALL, MAP OF AUSTRALIA FOR 1929. — The meteorologist of the Australian Commonwealth publishes an annual map showing the distribution of the rainfall over the continent. The 1929 issue shows interesting contrasts. The lowest annual rainfall (0.65 in.) occurred in the NE corner of South Australia. The heaviest (120 in.) occurred at Innisfail (lat 17.5° S.) on the coast of Queensland, different points of which received in January, February and March monthly rainfalls of from 30 to over 40 inches. At Port Macquaire (lat. 32°S), on the New South Wales coast, there was a rainfall of 110 inches, the highest recorded at that place. Tasmania had even more, the maximum exceeding 150 inches on the western mountains. Certain places in the southeastern lowland, however, had less than 20 inches. (*Monthly Weather Review*, Washington 1930, Vol. 58, No. 10, p. 423). T. B.

Soil Science.

SOIL, RESEARCH IN NEW ZEALAND. — The Prime Minister of New Zealand has announced the formation of a Division of the Geological Service for study of the soil, particularly in the pumice stone districts, with a view to improving their productivity by scientific methods. Recent research has emphasized the necessity for a better knowledge of New Zealand soils, specially in the volcanic regions of the North Island, where the problem of deficiency diseases of livestock is urgent. (*The American Fertilizer*, Philadelphia 1930, vol. 73, No. 6, p. 63).

GRASS AND FOREST SOILS DISTRIBUTION IN THE BIG HORN MOUNTAINS. — The Big Horn Mountains in the State of Wyoming, which rise to a height of 10,000 feet, are covered with pine timber to the extent of about $\frac{2}{3}$ of their total area, the remaining third is covered with grass and a small amount of low brush. There is no transition zone of bush or small trees between the timbered and grass areas. The line of demarcation is very sharp.

The soil in the timbered areas is usually shallow, stony and yellowish or greyish-brown in colour. In the grass areas the soil is generally much deeper and darker in colour (from dark-brown to black). The change in soil colour is just as sharp as the vegetation line, 1 or 2 rods' distance marking the transition.

The brown timber soils develop from dark-coloured grass soils and mature into grey ash-like (Podsol) soils. This process is characterised by an increase of acidity, removal of basic and organic materials, and a partial concentration of clays, iron and alumina in the subsoil (B horizon) and a concentration of silica in the surface soil (A horizon). The leaching process also produces progressively poorer soil, so that the grey timbered soils are less productive than the dark grassland soils.

This mountain region is too limited in extent for climatic factors to have influenced the distribution of grass and tree soils. The other factors which are responsible have been the subject of a study by T. J. DUNNEWALD. (*Journal of the American Society of Agronomy*, Geneva N. Y. 1930, vol. 22, No. 7, pp. 577-586).

He obtained the following results:—

(1) The grass vegetation produces dark-coloured acid soils with large amounts of colloidal black organic matter. When invaded by timber the organic matter from the trees starts a leaching process which reduces the soluble organic and mineral content of the soil.

(2) Timber will invade either acid or basic soil and its tendency is to increase the acidity of acid soil and to decrease the bases in a basic soil; iron, aluminium and phosphorus are removed less rapidly and calcium and magnesium more rapidly from a basic than from an acid soil.

(3) This leaching process makes acid timber soils less fertile and less productive grazing land than the grass soils, which contain more available phosphates and organic matter more rich in nitrogen.

(4) The bases are more actively removed when the organic matter is acting as soil cover than when it is intimately mixed with the soil. Iron, aluminium and phosphorus are removed less rapidly under these conditions from a basic soil and more rapidly from an acid soil.

DETERMINATION OF EXCHANGEABLE SODIUM IN SOILS. — It is known that the sodium (Na) ions absorbed by the soil complexes known as zeolites have a harmful action on the texture of clay soils, making them heavy, impermeable and difficult to work. This disadvantage is particularly evident in soils rendered alkaline by a certain proportion of soda and it is essential for the improvement of such soils to be able to determine accurately both the soda which is soluble in pure water and can be removed by leaching and that which may be removed by acid or saline solutions, *i. e.*, the "exchangeable" Na, which is replaceable by other cations.

Until recently no satisfactory direct method has been available for the determination of sodium; it had to be determined indirectly or by difference, with risk of errors and inaccurate conclusions. In 1884 STRENG succeeded in precipitating the sodium quantitatively as the triple acetate of uranyl, magnesium and sodium (STRENG's salt) by means of a mixed solution of uranyl acetate and magnesium acetate. In 1923 BIANCHETTIÈRE (*Bulletin de la Société chimique*, Paris 1923, No. 33, p. 807) improved this analytical method, which was then used successfully by M. Gabriel BERTRAND in his research on the presence of sodium in various plants. Working with plant ash he was able with this method to determine the variable and sometimes minute quantities of Na in a series of land plants hitherto supposed to lack sodium. (*Annales de la Science agronomique française et étrangère*, Paris 1929, an. 46, No. 1, pp. 1-8).

More recently RICE WILLIAMS (*Journal of Agricultural Science*, London 1930, vol. 20, part 3, pp. 355-358) has applied to the determination of the exchangeable sodium of soils the method of BARBER and KOLTHOFF, by which the Na is determined gravimetrically after being precipitated as the triple salt, zinc, sodium, uranyl acetate (containing 1.495 % Na) by a solution of zinc uranyl acetate. The exchangeable sodium was thus extracted by leaching soil with (1) a semi-normal solution of acetic acid and (2) a normal solution of ammonium chloride. The results with the two leaching agents showed good agreement.

The method has been made still more rapid by BLENKINSOP (*Ibid.*, vol. 20, part 4, pp. 511-516) by modifying it so that the sodium can be determined volumetrically to within 0.1 mg of Na.

As a result of these processes of technique the study of the behaviour of sodium in the soil and in plants and thus its role in agriculture will be able to make great progress.

Soil Improvement and Fertilisation.

IMPROVEMENT OF THE ALKALINE SOILS OF THE GREAT PLAIN OF HUNGARY. — In the Hungarian periodical *Mezőgazdasági Kutasások* (Agricultural Research) for January 1931 (an. IV, No. 1, pp. 11-23) Dr. ARANY publishes an interesting study of this subject. The following are his principal results.

For the improvement of the alkaline soils (called in Hungary "szik") 3 methods are in use: — (1) application of precipitated calcium carbonate; (2) application of marl from the subsoil; (3) covering light alkaline soils containing both soda and lime with sand.

(1) Carbonate of lime has been used for over 150 years in Hungary for improving the leached alkaline soils deficient in lime; it is of no benefit to soils containing soda and lime. It must not be ploughed in but incorporated with the soil by harrowing to a depth of 4 or 5 cm. Its action is to substitute in the complex "zeolite" soils the Ca ion for the harmful Na ion which spoils the texture of the soil. The limed soil becomes lumpy, permeable to water and air and easy to work. The increased permeability to water and air favours the growth and maturing of crops.

(2) Marling (in Hungarian "digó") is one of the oldest types of soil improvement in Hungary. It has made large stretches of the plain productive and the parts marled 150 years ago are still fertile to-day. The marls extracted from the subsoil are incorporated on the spot, but they must contain little soluble salts and no sodium. Their variable CaCO_3 content makes it necessary to vary the thickness of the marl layer to be incorporated.

Marling has the same effects on the soil and on plant growth as dressing of chalk.

(3) The thickness of the sand mulch to be applied to soils containing both calcium and sodium varies according to the nature of the soil from 5 to 60 cm., with a general average of 15 cm. The beneficial action of the sand mulch concerns the subterranean water level, the salt concentration, soil texture, etc.

ARTIFICIAL, NITROGENOUS FERTILIZERS IN BRITISH INDIA. — Until 1924 India had neglected to make use of the new economic sources of nitrogen. That year it manufactured 12,000 tons of ammonium sulphate as a by-product of steel and other works, but exported it mainly to Java where this fertilizer contributed to the production of cheap sugar which, imported into India, entered into competition with the home-grown sugar obtained by less scientific methods.

Happily in 1929 India ceased exporting sulphate of ammonia and even imported quantities which brought the total consumption of the fertilizer to about 32,000 tons. Such a consumption by the small cultivators (increasing yields by about 30 %) is an index of the revolutionary development of Indian agriculture. Taking 32,000 tons as the figure for 1929 and allowing that 100 lbs. of ammonium sulphate per acre gave a net profit of at least 10 rupees, it may be said that in this year the total increase in farming profits exceeded 7 million rupees. (*The Fertiliser, Feeding Stuffs and Farm Supplies Journal*, London 1930).

PRODUCTION OF PHOSPHATES IN ALGERIA. — The report of the Algerian Service of Mines gives the annual phosphate production as 14 million tons, distributed among the following producing centres.

Centres	Production
Kouif.	9 835 432 tons
Diebel Dyr	1 070 535 "
M Zaïta	1 018 879 "
Tocqueville	709 030 "
Bordj-Redir	660 127 "
Risna-Dila	647 966 "

WORLD PRODUCTION OF SULPHUR. — According to the Statistics of the United States Office of Mines the sulphur production of the principal producing countries (Unit-

ed States, Italy, Japan, Chili, Spain) has risen from 555,282 tons in 1900 to 2,700,107 tons in 1929. The distribution is as follows:— United States 2,362,389 tons — Italy 323,000 tons — Japan 58,718 tons — Chili 16,000 tons — Spain 10,000 tons. (*Engrais*, Paris 1930, no. 21, p. 659).

THE COMMERCIAL VALUE OF LIME MATERIALS. — The *Journal d'Agriculture pratique* (Paris 1930, tome I, no. 36, p. 193) gives some useful information in this connection.

The quality of a lime dressing depends mainly on its CaO content when it is quick or slaked lime, and on its CaCO₃ content when it is chalk, marl or powdered limestone. Purchasers should therefore require a guarantee of the CaO or CaCO₃ content before buying.

For chalk and powdered limestone it is necessary to require a guarantee also of the carbonic solubility, which is an index to the efficacy of dressing. The solubility being to a certain extent dependent on the degree of fineness of milling it is advisable to demand a guarantee also with regard to fineness. For powdered chalk, the solubility of which is high, it is not necessary to demand as fine milling as for semi-hard and hard limestone whose solubility is less.

Unfortunately in the absence of any legislation concerning the trade in these products in France a number of vendors refuse guarantees. It is thus desirable that the sale of lime products should be regulated as is that of fertilisers. A scheme of this nature is, it seems, under consideration.

Prices should be based on the content in the effective principle (CaO or CaCO₃).

[For other references concerning lime materials in this *Bulletin* see:— 1929, No. 5, p. 179; No. 8, p. 300; No. 9, p. 348; No. 10, p. 400; No. 11, p. 435; 1930, No. 1, p. 6; No. 2, p. 51; No. 3, p. 96; No. 4, p. 126; No. 5, p. 164; No. 8, p. 287; No. 9, p. 333. — 1931, No. 2, p. 44].

Ecology.

CORRELATION BETWEEN WEATHER AND WHEAT IN THE PUNJAB. — It is the practice of many Government Departments to issue at intervals during the growing season estimates of area sown in and probable yield of the principal crops. These estimates are based mainly on reports received from crop observers and are subject to modification with the advance of the growing season. The method is a subjective one, depending as it does on personal experience and judgment, and many attempts have been made to supplement and even to replace the present method by an objective one based on mathematical formulae embodying the results of research into the relations between weather and crops. Valuable contributions in this direction have already been made by various investigators, notably SHAW, HOOKER and FISHER (England), WALLÉN (Sweden), JACOB (India), MOORE, BRADFORD, SMITH, KINCER and MATTICE (United States).

In the Punjab R. S. Mukund UNAKER has attempted to determine by the method of correlation the influence of weather conditions on the area sown and the yield of wheat, and thus to derive formulae for predicting during each month of the growing season (October to March) the crop prospects. Using data for 35 years he calculates the correlation between temperature (using Lahore maximum temperatures), rainfall and (in the absence of data of actual consumption of water through irrigation canals) Indus river levels on the one hand, with area sown, gross yield and yield per unit area on the other.

With regard to area sown the most important rainfall is that of September, the correlation coefficient being + 0.61. Indus river levels are also important, the correlation with area sown being + 0.60 for September, + 0.51 for October, + 0.41 for November and + 0.29 for December. There is a negative correlation between maximum temperatures and area sown, indicating that high temperatures in the growing season are unfavourable to wheat.

With regard to gross yield high coefficients are obtained with Indus river levels, the values ranging from + 0.39 in December to + 0.72 in March. The influence of rainfall is most marked in September, December and March (correlation coefficient + 0.44 in each month).

Finally, the author compares estimates determined meteorologically and the official

forecasts with the final official returns of area sown and yield during each of the twelve seasons commencing 1913-24. He obtained the following correlation coefficients between the forecasts and the final official figures:—

Time of estimates	Meteorological estimates	Official forecasts
<i>For area sown.</i>		
End of October	+0.77	—
End of January	—	+0.91
<i>For gross yield.</i>		
End of January	+0.60	—
End of March	+0.65	—
Middle of April	—	+0.86

The author concludes: "Thus meteorological determination though fairly good is not so accurate as the official estimate; but the chief merit of the former is that it is known much earlier and is consequently of great agricultural interest". (*The Meteorological Magazine*, London 1931, vol. 65, no. 780, pp. 293-294).

T. B.

CROPS OF TEMPERATE REGIONS

General.

SYNONYMS COMMITTEES. — The National Institute of Agricultural Botany (Cambridge) has published its report for 1929-30. Of special interest are the statements concerning the forming of an expert Committee for cereal synonyms including delegates of the seed trade, of the Agricultural Merchants and of the Farmers' Union. Steps have been taken to prepare a register of all district varieties of economic importance and their synonyms. Thanks to the indefatigable effort of the Potato Synonym Committee which has been in existence for eleven years there are now few if any of the larger growers who are deceived by synonyms. The proportion of synonyms among the entries for the wart disease (*Synchytrium endobioticum*) immunity trials at Omskirk has been reduced from 72 per cent. in 1920 to 9 per cent. in 1929.

Genetics.

PEANUT BREEDING. — Peanuts are becoming an important crop in the south of the United States, their average annual value for the last few years being about \$50,000,000. To this figure may be added the value of the plants and roots for feed and for soil improvement. There is need at the present time for improved varieties which will produce nuts of superior quality, also, as the peanut industry expands the demand for varieties adapted to varied conditions and to more varied uses will also increase.

Breeding work now in progress at the Florida Agricultural Experiment Station has already produced by selection of Spanish peanut plants yielding sound nuts, definitely higher yielding strains. Since no existing variety has all the desirable characters it will probably not be possible to produce the best improved varieties without hybridisation. The cross *Arachis hypogaea* × *A. nambyquarae* is reported. The F₁ hybrids are in general intermediate between the parent species and appear to be fully fertile. (STOKES and HULL, *Journal of the American Society of Agronomy*, 1930, No. 12).

A SUCCESSFUL TRANSFER OF EMMER CHARACTERS TO VULGARE WHEAT. — Emmer (*Triticum dicoccum*) and the common wheats (*T. vulgare*) belong to distinct species differing in chromosome numbers (Emmer 2n = 28, Vulgare 2n = 42). For this reason the

problem of combining the desirable characteristics of the two by cross breeding is complicated by liability to sterility in the F_1 and following generations.

A cross was made with a pure line strain of Marquis as the pollen parent and a pure line strain of Yaroslav emmer ('speltz') as the seed parent. One plant only of the F_1 generation survived, from which 100 F_2 plants were grown. These and the following generation looked highly unpromising and were therefore harvested and threshed together. Since stem rust (*Puccinia graminis*) and several other diseases were exceptionally destructive that year most of the plants that did not possess a high degree of resistance to the various diseases produced badly shrunken grain. This gave the opportunity to separate the resistant types from the susceptible types by mechanical means, which eliminated 99 % of the seed. Between 4000 and 5000 plants were grown from the mechanically selected seed. Of these 6 finally were selected as possessing all the desired characters of the emmer parent while appearing to be true common wheats.

The six Yaroslav and Marquis selections were planted in progeny rows in what proved to be an exceptionally dry year, and 2 or 3 of them were found to be very resistant to drought. The following year a severe hail storm in July made it possible to select further for resistance to hail injury. The next year a severe epidemic of stem rust caused 100 % infection in the control rows of Marquis while the selections remained entirely free from this disease. They were however found to be susceptible to anthracnose and a form of root rot, but 63 plants were selected as being practically free from infection and were grown in progeny rows. Samples of the seed of the more promising of these were analysed for protein and gluten content, and the three best kept for further testing. The highest yielding of these was named "Hope" and distributed to experimenting stations. Hope wheat was found highly resistant to loose smut (*Ustilago tritici*) and to certain forms of bunt (*Tilletia levis*). It was found to have the same number of chromosomes as other wheats of the *vulgare* group.

Thus the emmer characters possessed by the common wheat segregates selected from the Yaroslav \times Marquis cross demonstrate that it is possible to transfer desirable characters from wheats of the 28-chromosome group to wheats of the 42-chromosome group by means of crossing followed by rigid selection. (McFADDEN, *Ibid.*).

Leguminous Crops.

SWEET CLOVER IN CORN BELT FARMING. — Sweetclover, a roadside weed 25 years ago, is to-day a crop of considerable economic importance in the Corn Belt of U. S. A. Two species are grown: the white (*Melilotus alba*) and the yellow (*M. officinalis*), but the former is preferred. Both are biennial but an annual variety of *M. alba* also exists. Lime and inoculation are essential for the successful production of sweetclover. (*Farmers' Bulletin* No. 1653, Washington D. C., 1931).

MONANTHA VETCH. — *Monantha vetch* (*Vicia monantha* Derf.) is a native of southern Europe and was first introduced into the United States in 1898. At the present time it is being grown successfully in the Pacific Coast States. The seed is edible and similar to lentils. It grows at a lower temperature than hairy vetch (*V. villosa*) or common vetch (*V. sativa*) and for this reason it is specially useful as a winter green manure in areas having mild winters. It makes good-quality pasturage, is a valuable winter leguminous crop and, while in full bloom, will make good hay. (*United States Department of Agriculture Circular* No. 152, Washington, 1931).

RESISTANCE OF NODULE BACTERIA TO LIGHT. — As a result of studies started in 1917 it was found that the general idea that sunlight is destructive to legume bacteria in soils is unfounded. Soils in which inoculated legumes have been grown were dried in sunlight and in the dark and no differences were apparent in production of nodule by these when used for inoculation. Dried soils, carefully stored, retained viable bacteria for four years. The ultra violet light which is the destructive portion of the sunlight fails to penetrate the soil to any significant depth. (ALBRECHT and TURK, *University of Missouri, Agricultural Experiment Station Research Bulletin* 132, Columbia, Missouri, 1930).

Horticulture.

THE VAN FLEET RASPBERRY. — A hybrid variety produced from the Chinese *Rubus inominatus* and the Cuthbert red raspberry in 1911. The variety has been tested at the Tennessee Agricultural Experiment Station since 1925 and found to have

valuable qualities. It is very vigorous in growth, not liable to disease, can withstand hot dry weather and is readily propagated by canes rooting at the tips, like the blackberry. It is not recommended for dry districts where the standard varieties can be grown, as its fruit has not all the desirable characters of colour, size and texture, but for drier climates. Its rank growth makes it advisable to space the plants 8 ft. apart in rows at least 10 ft. apart. At the end of the fruiting season the old canes are cut out. (McCRINTOCK, *University of Tennessee Agr. Ex. St. Circ.* 29, 1930).

A. M. F. & N. v. G.

TROPICAL AND SUBTROPICAL AGRICULTURE

A Review of the more important Recent Literature on Cacao.

General articles on cacao production and culture.

Interesting surveys of the world production and consumption of cacao and the cacao trade have been published by the Empire Marketing Board and by the Gordian. The Gordian discusses in different articles the development and present position of cacao culture in the different countries and the general cacao situation.

The following figures give the production and consumption in the last four years (July-June) in tons of 1000 kg.:

	World production —	World consumption —	Surplus production —	Surplus in percentage of production —
1929/30	479,888	432,568	47,320	10.9 %
1922/29	501,651	456,160	45,491	10.9 %
1926/28	442,401	421,217	21,189	5.0 %
1927/27	465,347	410,829	54,518	13.3 %

The increase in world production is more clearly seen when the production of calendar years is examined :—

<i>World production</i> (in tons of 1000 kg.)	
1926	476,303
1927	490,953
1928	513,806
1929	537,077

In the countries which produce the ordinary qualities of cacao (Gold Coast, Nigeria and the other African countries, Brazil and Costa Rica) the increase in production has continued, while in the countries which produce a cacao of higher quality, the production remains stationary (Venezuela, Trinidad and the other Antilles, Central America, Ceylon, Netherlands Indies, Samoa, Madagascar) or even decreases (Ecuador). There are, however, indications that a slight revival has set in in the Netherlands Indies. The decline of rubber-prices has induced the owners of some plantations to replant a part of their rubber fields with cacao or to extend their

cacao fields. The cacao export from the Netherlands-Indies in the last few years was as follows :—

Cacao Export from the Netherlands-Indies

(in tons of 1000 kg.).

	1926	1927	1928	1929	1930
12 months	904	915	1043	1251	
9 "	639	505	808	997	1,032
(Jan. - Sept)					

Ecuador. — In Ecuador the production since 1922 has constantly decreased. In the period 1901-1922 the average yearly export amounted to 40,000 tons; in the last 7 years it has decreased to about 20,000 tons. Especially in the Balao and in the Arriba districts the industry has gone backward in an alarming way. The following figures show the production in the different districts in 1922 and in 1929 :

Cacao Export in the different districts of Ecuador.

	Arriba	Balao	Machala	Manabi	Esmeraldas	Total
1922	29,696	6,836	2,002	1,827	—	40,361
1929	11,149	2,828	1,548	1,932	81	17,538

This decrease is mainly to be attributed to the ravages of the witchbroom disease (*Marasmius pernicius*). The application of control measures, especially the regular removal of the diseased twigs, is hardly possible in the Ecuadorian plantations, because the cultivation has always been extensive; the trees are standing closely and no pruning or very little has been done up till now. Another way of getting rid of the disease seems to have more chance of success in this country, viz. the planting of immune varieties. It has been reported, that such a variety has been found in Ecuador and that a few hundred hectares have already been planted with it.

Peru. — Peru is one of the cacao growing countries from which it is difficult to obtain information. It is the most southern of the countries along the western coast of South America. The greatest part of the cacao produced is consumed locally and the export is insignificant; it amounted in 1925 to 22 tons, in 1926 to 36 and in 1927 to 41 tons. In these years the import of cacao was 309, 342 and 87 tons. The main port for the export of cacao is Puno, of less importance are Mollendo and Iquitos.

Ivory Coast. — Among the French cacao-growing colonies the Ivory Coast is the most important. Its cacao industry has made a rapid growth; the export in 1910 was 10 tons, in 1920 1,036 and in 1929 16,362 tons.

The extension of the cacao area is limited by labour difficulties. In the central part (Tiassalé) and in the west-central par. (Oumé, Daloa, Gagnoa) labour is less scarce than in the other parts and only there are cacao plantations managed by Europeans situated. The native cacao farms are to be found principally in the eastern part (Indénie) between the railway and the Gold Coast colony.

Most of the plantations managed by Europeans are of a small size and not well provided with capital. The cultural methods are primitive and fermentation and drying leave much to be desired. In the native farms the conditions are still

worse. Insufficient and irregular fermenting and drying are here — as in various other cacao growing countries — serious shortcomings which have given to the Ivory Coast cacao a bad reputation. More advice and help for the farmers by the Department of Agriculture seem urgently desired.

Belgian Congo. — In this country cacao culture is gradually increasing. The exports were in 1927 837 tons, in 1928 850 tons and in 1929 1,087 tons. The railway carries a great part of the product to the coast, viz. in 1927 556 tons, in 1928 555 tons. Of the total export in 1928 (850 tons) 505 tons were shipped from Boma, the port of the Mayumbe district, and 280 tons from Matadi.

The present area amounts to about 2,000 ha. The plantations are in the hands of Belgian Companies and most of them are situated in the Mayumbe region (Lower Congo between the Tschitoango and its tributary the Lukula). In this country also the great difficulty is the scarcity of labour.

Botanical.

Wild cacao. Important information has been obtained about the occurrence of wild cacao in the forests of British Guiana.

Some years ago STAHEL found cacao growing wild in the forests of Surinam and at a much earlier date SCHOMBURGK reported its presence in the forests of British Guiana and Brazil. Interesting particulars about wild cacao in these regions was supplied by OGILVIE. He wrote as follows:— "The farthest north that I have seen cacao is in Black Creek, a branch of the Essequibo on the right bank, some distance above the mouth of the Rupununi River. It is plentiful in this creek, so much so that a balata bleeder (1) in 1911 thought he had stumbled across an abandoned Dutch plantation and tried to get up a company in Georgetown for its exploitation. I have also seen cacao on the Berbice River, the Berbice at this point being only a tiny creek".

The cacao was seen near Primos Inlet earlier by SCHOMBURGK (1848).

OGILVIE had seen wild cacao also "on the upper branches of the Rewa and Quitaro creeks (the Rewa is a branch of the Rupununi River). Cacao occurs plentifully at points on the Kuduwin, Kassikedju or Dewar Wow, on the Kanu and Shewdikar creeks — all branches of the Upper Essequibo, as also on the main river itself".

It occurs again "on the Mapur Wow, the Trombetas and the Ha River".

SCHOMBURGK saw cacao growing wild on the Capiwhuni (Kafuwini), a branch of the Trombetas, which is in its turn a tributary of the Amazon, and also on the Cutari (at the head of the Corantine) and on the Upper Guidaro (Quitari), both places where OGILVIE has also met with it. The type of this wild cacao is apparently pure.

Varieties.

REYNE has found that Surinam also ranks among the countries where the Criollo variety was formerly cultivated and where it was superseded by the Forastero variety. He could still find pure Criollo trees on abandoned plantations, near the Cottica River and near the Mapane and Tempati creeks.

It was to be expected that the same substitution of Forastero for Criollo would also have taken place in British Guiana. This supposition is corroborated by the occurrence of cacao trees in which Criollo characters are unmistakably to be seen

(1) "Balata bleeder" is the name given in British and Dutch Guiana to the man who taps the wild growing "balata trees" (*Mimusops balata*); balata is a kind of guttapercha.

in a place, Coomacka, on the Berbice river. Here the remains are found of a cacao plantation established some 200 years ago by a Dutch planter. The Criollo characters of these cacao trees are so conspicuous that Prof. HARRISON supposed them to be identical with "Golden Caracas Cacao", i. e., pure Criollo. This however is not the case.

The effect of shade trees.

Russo gives important information on the decay of cacao fields in the Dominican Republic.

The cacao thrips (*Heliothrips rubrocineta*), which causes so much damage in different countries (San Thomé, Trinidad, Surinam, Brazil), is very injurious also in the Dominican Republic and the direct cause of the decay of many plantations.

Russo observed in Santo Domingo, as has also been observed in Trinidad and Surinam, that the cacao fields without shade or with insufficient shade suffer especially from thrips. The conclusion of Russo is, that the poor conditions of the trees is a consequence of the combined action of thrips and the direct sun rays. This conclusion, however, is probably not correct and it is more probable that the absence of shade has caused the soil to deteriorate and thus has indirectly weakened the trees and made them more liable to thrips attacks.

Anyhow the observation of Russo confirms the opinion that the pest must be controlled by improving cultural conditions, especially by affording sufficient shade by suitable shade trees.

Fermenting and drying.

In the last twenty or thirty years a considerable number of investigations have been carried out in order to elucidate what substances are formed by the "external" fermentation (the fermentation of the pulp) and what influence they exert on the cacao bean. It cannot be said that these investigations have led to any important discoveries. At any rate they have not succeeded in finding a weak point in the old empirical way of fermenting, and the fine Criollo as well as the common Forastero are still fermented in the same way as in old days.

The past year gave us a few more publications on fermentation.

In the fermenting heap we see first the apiculatus-yeast (*Saccharomyces apiculatus*) preponderate; gradually it is replaced by "wine yeasts". Soon the development of vinegar bacteria sets in and at the same time that of other kinds of yeasts and of *Oidium*, which fungus feeds on the alcohol and the acetic acid developed by the yeasts and bacteria. While the temperature rises and the acidity increases again other organisms, which are especially adapted to these conditions, such as *Bacillus subtilis* and allied bacteria, begin to develop.

Some investigators presume that in this process the development of acetic acid by the vinegar bacteria must be regarded as an unfavourable factor, so that it would be desirable to find a method by which it may be suppressed. The correctness of this cannot yet be considered as proved.

HENNEBERG and ZELLER, who share the opinion of the noxiousness of the acetic acid, tried to avoid the development of vinegar bacteria by adding pure cultures of yeast to the beans, and also by applying bactericidal substances. These experiments had no success. The same must be said of the experiments in which lactic acid or a pure culture of lactic bacteria was added.

More success was obtained by ZELLER in Cameroon by continuing the fermentation a few days longer than usual — 8 to 10 days instead of 6 to 8 —, making the fermenting heaps not higher than 60 cm. and turning the beans over every 12 hours.

By the two last mentioned measures he succeeded in keeping the temperature of the fermenting cacao a little lower than usual. In applying this method care must be taken that the fermentation is stopped before the development of butyric acid sets in. ZELLER is of opinion that he obtains in this way a cacao which contains less acetic acid.

STEVENS had tried a few years ago to prepare the beans in quite a different way, namely without fermentation and by subjecting them to a temperature of between 40° and 60°C. Different investigators have subjected this method to a trial, but invariably the effect was unsatisfactory. In Costa Rica the method was applied for some time on a large scale in the plantations of the United Fruit Company and a product with a good appearance was obtained, which at first was favourably received by the brokers, but the quality of the cacao was considered unsatisfactory by the experts. In the same way the cacao, prepared with the STEVENS method in Java, was considered as inferior in quality by the experts in Europe. However, for cacao from fruits damaged by fungi and which will not ferment well, being soon subject to rotting, the method seems to have its advantages. ZELLER applied it with success in Cameroon on cacao from fruits attacked by black rot (*Phytophthora palmivora* = *Phytophthora jabori*). For this purpose a wooden box was used, large enough to contain 3 tons of wet cacao. First the beans were subjected during 24 hours to a temperature of 50° to 60°C, then they were washed in water of 45° and finally they were put again into the box and kept there for 4 days at a temperature of 50° to 60°.

Chemistry.

The amount of non-saponifiable compounds (sterols) in cacao-fat of different origin was determined by LABBÉ. According of these investigations the sterols in cacao fat from Lomé, Accra, Trinidad, Bahia, Cameroon and Venezuela (Caracas), amounted respectively to 0.26, 0.34, 0.345, 0.40, 0.40, 0.70 gr. per 100 gr. fat. In the beans (fermented and dried), of the same lots the amount of sterols was 0.20, 0.20, 0.195, 0.21 and 0.35 gr. per 100 gr. of beans.

It is not permissible to regard these figures as standard figures and to conclude for instance, that as a general rule the fat of Venezuela (Caracas) cacao is much richer in sterols than the fat of Accra cacao. For such a statement a much larger number of samples would have to be investigated.

Grading.

Grading of cacao by the Government in Nigeria has already been done for some years and the results of this system, in connection with the work of the Government fermenting houses, may be regarded as very satisfactory. The quality of Lagos cacao, which is wholly a product of small native farmers, has shown a marked improvement.

On the first of October a new regulation of grading was issued. The different grades according to this new regulation are defined as follows:—

"Grade I. — Cacao must have under 5 % defective and under 5 % slatey beans.

"Grade II. — Cacao must have under 10 % defective and under 5 % slatey beans.

"Grade III. — Cacao must have under 8 % of defective beans.

"Grade IV. — Cacao must have under 20 % of defective beans.

"Defective beans in these first two grades are all such beans as have been previously counted defective. In grades III and IV germinated beans, which are not mouldy, are not counted as defective".

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Dr. C. J. J. VAN HALL.

Notes.

RICE VARIETIES GROWN IN MADAGASCAR. — The rices cultivated in Madagascar may be classified in 5 types :— (1) long- and large-grained, (2) long- and narrow-grained, (3) semi-long-grained, (4) short-oval-grained and (5) small-grained.

There are about a hundred varieties of each type, not all of which are exportable. The following are the most important :—

(1) *Varieties with long, large grains, not translucent.*

Vary Lava, Telo Volana, Mangaka, Ranarana, Tomboka.

(2) *Varieties with long, narrow, translucent grains.*

Tsipala, Kalila, Bengaly marima, Madiomatraka, Makalioka, Vato patsa.

(3) *Varieties with semi-long, translucent grains.*

Manitra, Kokomoja manitra, Manautsoa, Renivaza, Bengaly madinika, Mahagaga, Angaky, Randrambolo, Anana, Mahia, Mandriravina, Samaitsoke, Lohambitro, Bemana, Vondrona, Mena hoditra, Tsarramandoro, Rambontsoavaly, Angikabe, Bengaly vakaheny, Tsimbina, Roka mena, Angika, Bemahasoa, Ovibe, Mahira, Menakely, Telovolana marima.

(4) *Variety with short, oval, translucent grains.*

Madinika.

(5) *Variety with small, translucent grains.*

Kiriminy.

For standardisation purposes all these 5 types of varieties may be included in the Vary Lava and Translucent Madagascar classes.

The following are the principal rice growing regions of Madagascar :— Majunga, Morondava (west) — Tuléar (south) — Tamatave Maroantsetra (east) — Diego-Suarez (north) — Alaotra, Tananarive, Antsirabé — Betafo and Betsileo (central). (FRANÇOIS E. and CHAUFFOUR P., *Riz et Riziculture*, vol. 4, fasc. 3, 1930).

CLASSIFICATION OF BENGAL RICES. — From an agricultural point of view the rices of Bengal fall into 5 classes :—

(1) Mountain *Aus*, or early rice. Sown in April-May, harvested July-September.

(2) *Aman*. Winter rice, sown in the seed-bed in June-July, planted out in July, harvested October-January.

(3) Lowland irrigated *Aus*.

(4) Lowland irrigated *Aman*.

(5) *Boro*. Spring rice.

(HECTOR G. P., *Agricultural Journal of India*, vol. 25, part 2, 1930).

INFLUENCE OF ENVIRONMENT ON GROWTH OF RICE. — Studies of various varieties of paddy have shown that a rice never grows so well as in its original home; it is thus very susceptible to environmental influences. M. R. L. SETHI therefore has made a thorough study of the physiology of rice and its reactions to changes in environment. He carried out two series of experiments, one in the field and the other in pots. The pots measured 21 cm. in diameter, 22.5 cm. in height and contained 6 kg. of soil. He used also larger pots and boxes. The experimental rice field was about 20 ars in area. Three groups of experiments (which confirmed the pot experiments) were carried out as follows :—

(1) Culture experiments with different methods of irrigation.

(2) Culture experiments with different methods of preparing the soil.

(3) Culture experiments with different fertilisers.

The results were the following :—

(1) A clayey soil is more adapted to rice growing than a loamy, sandy or gravelly soil.

(2) Fertilisers should be applied before the time of flowering.

(3) Increased water content of the soil improves yield but retards ripening. Irrigation alternating with periods of dryness increases grain production.

(4) Rice is not an entirely aquatic plant, particularly in its early stages of growth. Oxygen must be supplied to the roots by frequent renewal of the irrigation water. (*Bulletin Economique de l'Indochine*, 33^{ème} année, octobre 1930 - B.).

COTTON GROWING IN THE STATE OF SYRIA IN 1929. — In 1929 an acreage about 4 times as extensive as that of 1928 was planted with cotton. The following table shows the cotton acreage in 1928 and 1929 in the different parts of Syria.

Regions	1928	1929
	ha.	ha.
Sandjak of Alexandretta	45	61
Province of Aleppo	4 190	16 528
Sandjak of Deir	—	15
Region of Damascus	150	745
Total	4 385	17 349

The 17,349 ha. were divided amongst the Baladi, American (Lone Star) and Egyptian (Piliou, Maarad, Zaghora) varieties in the following manner :—

Baladi cotton	16 203.7 ha.
American	939.7 »
Egyptian	205.6 »

With a view to still further increasing the industry the Ministry of Agriculture and Commerce has drawn up a scheme of activity, some parts of which are already being carried out. The scheme includes :—

- (1) setting up two ginning factories,
- (2) forming a Cotton Grading Office,
- (3) organising a service of information on current cotton prices,
- (4) supplying growers with American Lone Star seed as a precaution against the degeneration of this variety,
- (5) providing funds for cotton growing,
- (6) crop insurance.

(ACHARD M. E., *L'Agriculture Pratique des Pays Chauds*, n° 9, mars 1931).

DEVELOPMENT OF RUBBER PLANTATIONS IN THE FAR EAST. — Rubber planting was started about thirty years ago.

Table I shows the extension of the plantations since 1904 and their production since 1910.

TABLE I.

	Area planted	Production
	ha.	tons
1904	20 000	—
1910	567 000	11 000
1915	1 214 000	115 000
1929	2 631 000	820 000

The 1929 production was distributed as follows :— Malaya 450,000 tons — Netherlands Indies 250,000 tons — Ceylon 70,000 tons — Other countries 50,000 tons. Malaya and the Netherlands Indies possess 86 % of the world rubber plantations. Until 1915 the rubber estates were almost exclusively owned by Europeans. Table II shows the development of the native rubber planting since 1915 in the Netherlands Indies and Malaya.

TABLE II.

	Malaya	Netherlands Indies
	ha.	ha.
1915	Area negligible	Area negligible
1922-1923	498 000	146 000
1929	566 000	526 000

THE PINEAPPLE INDUSTRY IN THE HAWAIIAN ISLANDS. — See *Agricultural Industries*: Notes, p. . . .

IVth INTERNATIONAL CONGRESS FOR MEDICINAL PLANTS AND HERBS. — This Congress will be held in Paris, July 16-21, 1931, under the auspices of the International Colonial Exhibition. It is being organised by the French Committee of the Federation

of Medicinal, Aromatic and other Plants, with the co-operation of the 'Comité Interministériel des Plantes Médicinales et des Plantes à Essences' and of the 'Office national des Matières premières végétales pour la Droguerie, la Pharmacie, la Distillerie et la Parfumerie'.

The provisional programme of events is as follows:—

First day — IVth meeting of the International Permanent Committee. Reception of the Official Delegates of the Governments. Verification of the credentials at 4.0. p. m. in the 'Salle des Actes' of the Faculty of Pharmacy of the University of Paris, 4, Avenue de l'Observatoire. Ceremonial reception and visit to the Museums of the Faculty.

Second day — Technical day, reserved for the scientific Commissions:— botany and chemistry applied to the study of drugs, etc.

Third day — Agricultural day, reserved for the cultivation and harvesting of medicinal and aromatic plants:— questions of production and varietal improvement, fertilising, utilisation of labour, drying, preparation, etc.

Fourth day — Economic day:— Drug trade. Transport. Storage. Discussion of the resolutions.

N. B. A free day will be provided for visiting the Exhibition and one or more for excursions to some of the producing districts.

The sessions will be held in the Palais des Congrès de l'Exposition coloniale.

This programme is subject to alteration.

The Office of the Congress requests that any persons and agricultural or commercial societies interested will send in as soon as possible the titles of communications they wish to present to the Congress. Abstracts of such communications will be issued in the languages accepted by the Federation. All communications should be addressed to M. le Secrétaire Général, Avenue du Maine, 12, Paris (XV^{ème}).

J. L.

AGRICULTURAL INDUSTRIES

Lactose: its Preparation and Uses.

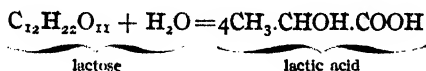
The manufacture of lactose, or milk sugar, has developed considerably of recent years, especially since the discovery of the biochemical action which makes it able to serve as the basis for the manufacture of a number of medicaments, notably homoeopathic. New technical uses also are being found for it year by year.

For these reasons dairies and casein factories which have at their disposal large quantities of whey should find the manufacture of lactose economic and profitable. But, seeing that the returns from the manufacture of lactose depend largely on the quantity present in the whey, it is necessary in the first place to know the properties of the sugar and the methods for its determination in whey, the methods of preparation and the types of apparatus used.

I. PROPERTIES OF MILK SUGAR.

Lactose ($C_{12}H_{22}O_{11} + H_2O$) is a disaccharid which occurs in true solution in cows milk, at the rate of 4.7 % on an average, giving it a sweetish taste. When 0.6 % of lactic acid is formed milk coagulates spontaneously; the lactose obtained by concentration of the whey is not crystalline. By crystallisation of an aqueous solution of lactose hard crystals with the formula $C_{12}H_{22}O_{11} + H_2O$ are obtained. The presence of a certain quantity of salts in the lactose solution hinders crystallisation. The difference in solubility of lactose in hot and cold water constitutes a difficulty particularly in its preparation from condensed milk, plain or sweetened, as soon as it reaches a certain density. Lactose is distinguishable from saccharose specially by its lower sweetening capacity and lower solubility. If lactose crystals are heated to a temperature of 110-130°C they lose their water and if the temperature is raised still higher become yellow and then brown, forming "lactocaramel". Lactose is

insoluble in alcohol and ether but dissolves in hot acetic acid. Another important property of lactose is its ready decomposition in solution by bacteria. Various types of fermentation are produced by different bacteria, lactic being the most important :



It is of great importance in the lactose industry to avoid lactic fermentation in the treatment of whey.

A number of bacteria are capable of causing lactic fermentation. They may be differentiated by (1) resistance to heat in liquid media, some being killed by 5 minutes at 60°C. others resisting 10 minutes, etc. ; (2) the speed with which they coagulate milk at different temperatures ; (3) resistance to desiccation ; (4) the degree of acidity produced, etc. By the action of these micro-organisms milk is coagulated rapidly between 30 and 35°C. Lactic fermentation ceases at temperatures below 10°C and above 45°C. The products of lactic fermentation are :— lactic, acetic and carbonic acids, traces of acetone, alcohol and formic acid. Lactic ferments keep better in a neutral than an acid medium ; some are aerobic, others anaerobic or indifferent. They are capable of converting up to 95 % of the lactose into lactic acid if they are provided with peptone (an excellent source of nitrogen). Lactic acid produced by fermentation is ceramic, but not always inactive. By means of the fungus *Penicillium glaucum* a dextro-lactic acid is obtained, with *Bacillus acidilaevolacti* a levo-lactic acid. Various other bacteria are capable of decomposing inactive lactic acid produced by fermentation and of consuming one of the active acids produced, leaving the other.

Racemisation of lactic acid is thus analogous to that of tartaric acid. The development of lactic ferments cannot be obtained with the mineral compounds occurring in milk, whereas it is readily obtained in lactose solutions in the presence of ammonia salts. The addition of polybasic phosphates greatly increases the production of lactic acid.

Certain mineral salts, such as bichloride of mercury or sulphate of copper, check fermentation, but in sufficiently small quantities encourage it. Salts which in the proportion of 1/10 of a molecule to the litre retard lactic fermentation are those of sodium, potassium, lithium, magnesium, calcium, strontium and barium. For salts of iron, magnesium, lead, zinc, uranium and aluminium 1/1000 of a molecule to the litre is enough to retard fermentation, while 1/1000,000 of a molecule to the litre is enough for salts of copper, mercury, silver, gold, platinum, cadmium, cobalt and nickel.

Among the industrially important lactic acid bacteria must be mentioned :—

Bacillus caucasicus, which converts lactose to lactic acid and is used in the preparation of *kéfir* (a beverage obtained also from milk) in the presence of the yeast *Saccharomyces kefir*. This yeast decomposes lactose by means of a diastase (lactase) and alcoholic fermentation then sets in ;

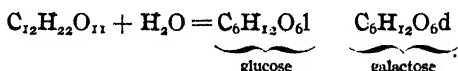
Bacterium coli communis, which resembles the typhus bacillus but is distinguished from it by its property of fermenting all the mono- and di-saccharid sugars and, in a special manner, lactose, while the typhus bacillus remains inactive in the presence of milk sugar. *B. coli communis* coagulates milk rapidly at 24-28°C producing a quantity of acid and liberating much CO₂ and hydrogen. In the presence of air it produces from lactose alcohol, acetic acid, lactic acid, etc. Two strains of *B. coli communis* are distinguishable :— *l* and *d*, the former giving a levorotatory lactic acid

and the latter a dextrorotatory acid when a suitable form and quantity of nitrogenous nutrient is supplied ;

Bacterium D., extracted from Brie cheese, which ferments lactose rapidly with the formation of a dextrorotatory lactic acid.

Milk sugar may also undergo alcoholic fermentation as a result of the action of various yeasts, but this is of less importance in the lactose industry.

Lactose is broken down by the action of certain diastases (*e. g.*, lactase) into glucose and galactose, thus :—



Hydrolysis occurs also in the presence of dilute inorganic acids.

Determination of lactose in whey. — For the determination of lactose in solution no universal method has as yet been adopted such as, for example, for the determination of fats. There are however several methods, notably that of SCHEIBE, the polarimetric method of SALKOWSKI and the refractometric method of WOLLNY.

II. — MANUFACTURE OF LACTOSE.

Economic practicability of milk sugar manufacture. — Whey produced as a result of the precipitation of casein by pressure differs from that obtained by coagulation by acids particularly in its content in lactose and lactic acid. The former contains 4.5-5 % of lactose and traces of acetic acid, while the latter contains 3.8-4 % of lactose and up to 0.8 % of lactic acid.

The various components of whey are not always equally utilisable, which fact makes it important to determine their percentage systematically, taking into account the factors which impede the extraction of lactose and reduce its content for practical purposes. At the present time, for instance, it is considered satisfactory if 2.5 to 2.8 kg. of lactose are obtained from 100 kg. of milk. About 76.6 kg. of whey are yielded by 100 kg. of milk. As this amount of whey gives 3.2-3.5 % instead of the possible 5 % of lactose only 2.68 kg. of crude lactose or 2.15 kg. of refined lactose are obtained.

Prevention of bacterial fermentation of lactose. — A simple and reliable method of avoiding the harmful action of acidifying bacteria consists in cooling the milk to 12°C, for at this temperature the bacteria can barely exist. Their action is thus checked, but it recommences if the lactose solution is heated to 15°, reaches its maximum between 30° and 40°, then diminishes till it finally ceases between 45° and 50°C.

Another simple and economic method is to add 'Milchsüss', which is a liquid containing gaseous substances which are toxic to the bacteria and are later eliminated by steam during the concentration of the whey *in vacuo*. 'Milchsüss' acts exclusively on the acidifying bacteria, not checking the development of the micro-organisms necessary to the maturation of cheese, nor in any way affecting the coagulation of the milk. It is thus advisable to add the 'Milchsüss' immediately after milking and so retain all the original lactose content in the milk and the whey without any being converted into acid.

For this purpose UNGNADE recommends adding from 0.01 to 0.025 % of 40 % formalin or a solution of magnesium and sodium bisulphites. In 'Milchsüss' the active principle is also formalin.

An essential feature for the profitable manufacture of lactose is certainly the use of really fresh whey. If the whey is sour its sugar content is so much reduced that lactose extraction is no longer profitable.

Elimination of impurities. — The elimination of fats, albuminoids and salts is more difficult than that of the water. First the *fats* are removed. If they are present in sufficient quantity for separation to be profitable the whey is centrifuged; if the whey comes from poor milk separation is naturally not profitable, but sometimes the whey is condensed by evaporation till the cream content is high enough for separation. The elimination of albuminoids, salts and any remaining fat is also carried out in highly concentrated whey or in the thick syrup from which the greater part of the water has been removed. The butter yield of whey fat obviously depends on the fat content of the liquid or concentrated whey.

Separation and complete elimination of protein. — There are serious difficulties in this operation. The methods used produce such a finely divided coagulum that filtration is difficult and slow, the pores of the filter soon becoming blocked by the protein deposit. Moreover the first filtration is often imperfect and the clear filtrate when treated a second time still leaves a considerable albuminoid deposit so that it is necessary to filter yet again.

It is essential to coagulate the albumen in a readily filterable form. When the albuminoid matter is eliminated one of the main causes of lactic acid formation at the expense of lactose is removed for lactic bacterial activity is stopped and there is thus no fear of further losses of sugar. A further laborious filtration is also avoided.

The operation is carried out as follows :—

(1) The whey is neutralised and filtered to separate completely the coagulated protein still in suspension.

(2) Excess acidity is neutralised with calcium or barium carbonate. The latter is preferable because it forms an insoluble sulphate.

(3) The liquids thus prepared are sterilised in special autoclaves of galvanised iron, which have been previously sterilised with gaseous formalin. The initial pressure is between 1 and 2 atmospheres. When the liquid is compressed heating is begun by means of a coil or by passing steam into a double bottom of tinned copper. To ensure rapid and uniform heating the autoclave is fitted with a stirrer which is kept in action during the operation; the exterior of the autoclave is covered with an insulating material to avoid all loss of heat.

The maximum temperature to which the liquid is heated is 125°C; if this is exceeded the whey may become discoloured.

This temperature and pressure is maintained for a certain time, while the liquid is constantly agitated. The pressure is then allowed to sink until the liquid boils; boiling is maintained for a time at the same pressure so that the albumen may coagulated. Steam is passed into a twin autoclave containing neutralised whey ready for its first treatment.

The albumen is coagulated and precipitated almost entirely in the form of granular masses and frequently in a form which is readily separable by filtering, siphoning or decanting.

The liquid then passes through mechanical filters to eliminate completely the substances in suspension. From the coagulated albumen are obtained compressed cakes which can be used as fertiliser. When the concentration of the filtrate has reached $\frac{1}{3}$ of its original volume it is allowed to cool, it is decanted and passed again through mechanical filters.

The filtrate must be absolutely clear and transparent and have a slightly amber tint.

When the casein has been precipitated with sulphuric acid the addition of milk of barium carbonate is preferable to that of lime, because an insoluble sulphate of barium is thus obtained.

Separation of lactose. — The clear filtrate obtained then contains only lactose, the natural inorganic salts and those added during the preceding operations.

Concentration of albumen-free whey. — This is effected *in vacuo* and almost always in double effect. The evaporation process is complete when the albumen-free whey has reached a density of 30-32°Bé, corresponding to a 60% concentration. Evaporation is regulated by fans and care is necessary to remove the contents of the vacuum pans before they become viscous and adhere to the apparatus.

Crystallisation. — The contents of the vacuum pans are poured into special crystallising containers and allowed to cool. Some factories employ for this purpose rectangular iron tanks measuring about 1.5 m. long, 0.6 m. wide and 0.9 m. high; these tanks are immersed in others through which cold water is continuously circulating. The mass is stirred gently three or four times while it thickens gradually until after 24 hours it is transformed into a product containing large grains and with an oily layer on its surface.

Centrifuging. — The crystals of lactose are separated from the massecuite by centrifuging. The centrifuge employed differs from milk separators in working at a lower velocity and intermittently, for it must be stopped whenever it is filled. The cylinder is perforated and fitted with a filter cloth. The lactose centrifuge has a larger capacity also than the milk separator. When the centrifuge has reached the required velocity the mass diluted with cold water is slowly discharged; the liquid passes through the filter and emerges by a special opening. When the cylinder is full the crystalline mass is washed by a jet of cold water, then the machine is gradually stopped and a crude lactose of a clear yellow colour is obtained, containing still 10 to 15 % of impurities (albumen, salts, etc.) and corresponding to 2/3 of the total lactose originally contained in the whey.

The rich syrup left after centrifuging has a density of about 15°Bé and still contains 1/3 of the lactose together with the rest of the impurities which prevent the final crystallisation of the lactose and must be eliminated.

Purification and decolorising. — Before being put on the market the lactose must be refined. This is carried out sometimes in special refineries and in this case the lactose must be dried to prevent decomposition. If the refining process follows immediately on the preparation of the crude lactose drying is not necessary.

To whiten the lactose and remove any flavour and odour, animal or other chars or even decolorising earths such as Norit, Florida earth, etc. are added. At the same time any remaining albuminoid matter is precipitated by adding 200 gm. of acetic acid for every 100 kg. of solution and heating to 90°. To eliminate phosphoric acid a little magnesium sulphate is added and then the solution is heated again for a few minutes until a thick scum forms and the liquid becomes clear with the precipitate suspended in large flakes.

Filtration. — To remove the precipitate the syrup is filtered while still boiling in filter-presses with a large filtering surface. They are made up of 20 to 50 adjacent compartments, only a few centimetres in depth and 70 to 75 cm. square, supported on perforated metal. In the 1st, 3rd, 5th, 7th, etc. of these compartments the filter residues are compressed while from the intermediate compartments (2nd, 4th, 6th, etc.) the filtrate passes into a small trough. The residues collected in the filter-presses are washed with water under pressure to free them from any possible remaining lactose. The compressed cakes removed from the filter-presses are then treated with sulphuric acid, which gives a superphosphate of good fertilising value on account of its high content in nitrogen and available phosphate.

The clear sugar solution from the filter-presses is concentrated *in vacuo*, to a density of 35° Bé and passed boiling into crystallising pans. After the crystallis-

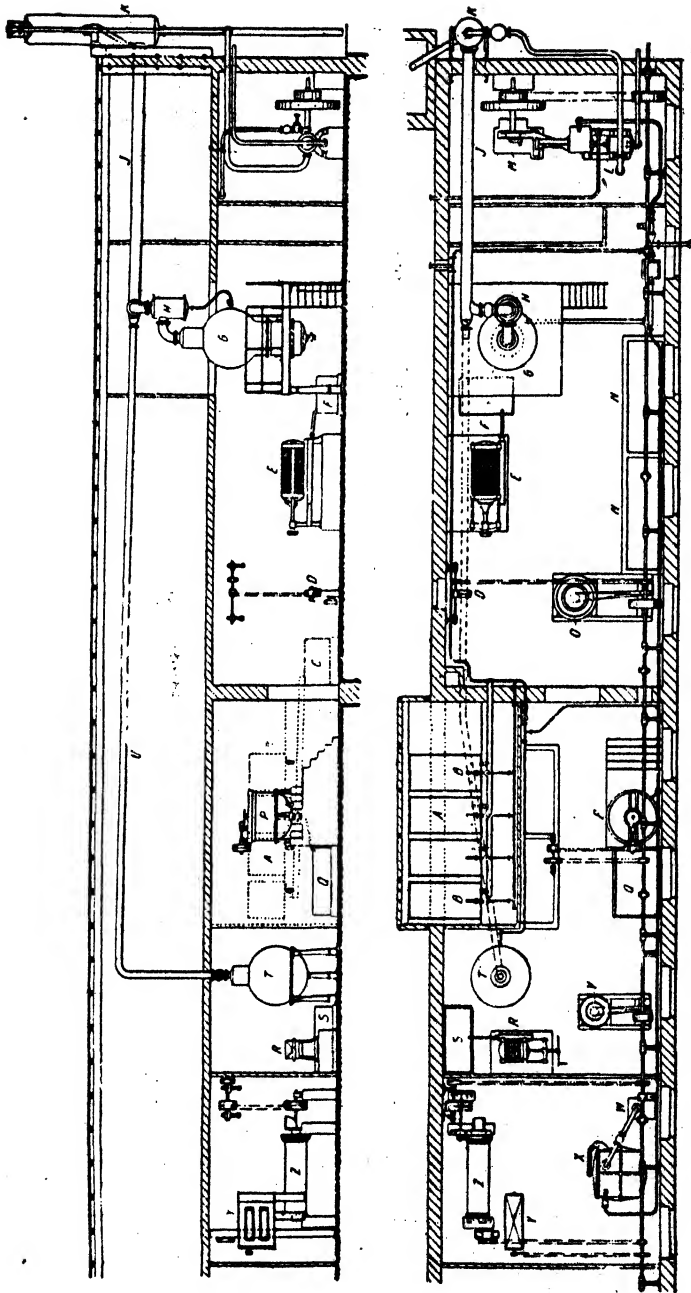


FIG. 1. — Diagram of the lactose manufacturing plant of Mess. s. Emil Passburg.

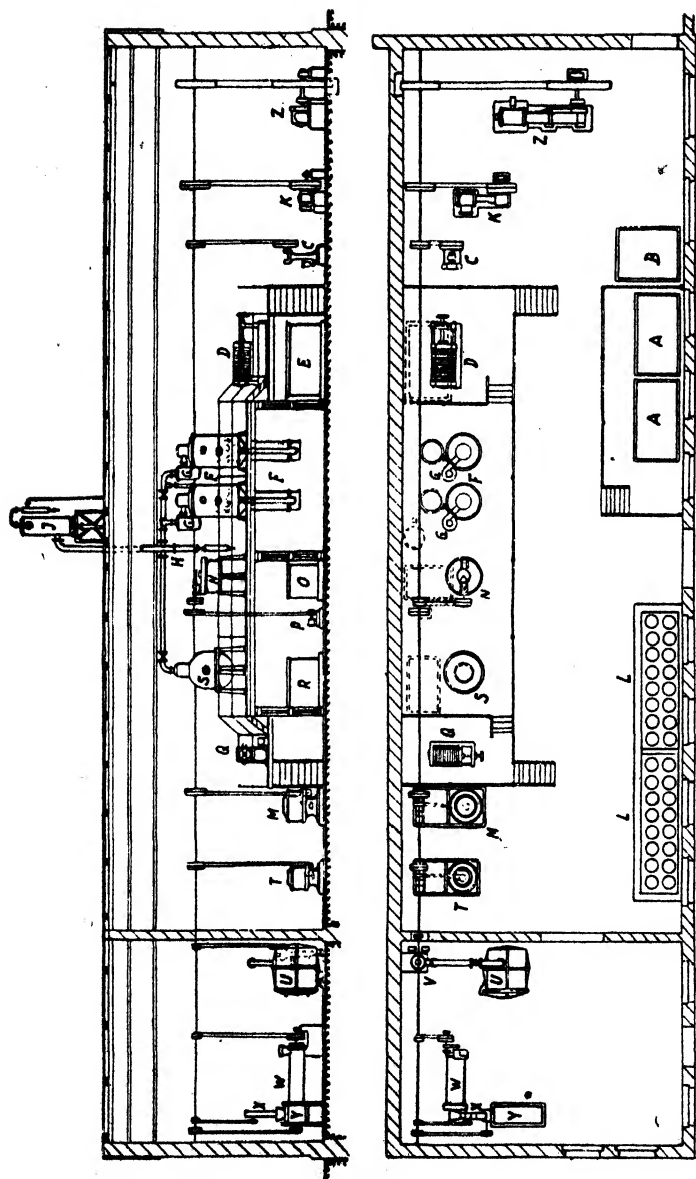


FIG. 2. — Diagram of the latex manufacturing plant of Messrs. *Vilhm r Hân g & Co.*

ing process, which lasts several days, the syrup is separated by centrifuging from the fine crystals (first product). Further centrifuging gives in succession the 2nd and 3rd product.

Final product. — All these products must undergo separately or together a further refining to obtain the fine white powder of the refined lactose of commerce. The sugar is dissolved in the quantity of hot water required to give a density of 15°Bé. The syrup is then boiled with small quantities of aluminium sulphate or calcium chloride or other coagulants to precipitate the colloids (albumen, etc.) ; the solution passes through filter-presses and the clear liquid obtained is concentrated in vacuum pans. At 22° Bé it crystallises. By centrifuging a sufficiently white product is obtained which is then dried in rotating tinned cylinders or in hot-air desiccators. When the sugar is dry it is allowed to cool and is then ground to a fine powder in a porcelain mill. The product for export must not be 'sandy' to the touch; so after milling it is passed through a very fine flour sieve and the residue is returned to the mill. The product must then be exposed to the air for a few days.

Lactose manufacturing plant. — The general method of manufacture that has been described is modified in most factories by the use of special apparatus, and though the general procedure remains the same there may be said to be as many variations as there are factories. Some of the most important only will be described here.

The machine manufacturing firm of PASSBURG (Berlin) gives the system represented in fig. 1. The whey is pumped into the tanks *A* in which the protein is precipitated and which are heated by steam circulating in the coils *B*. From these tanks the whey passes into a reservoir *C* from which the pump *D* leads it into the filter-presses *E*. The filtrate is collected into the tank *F* and after neutralisation with soda is pumped into the vacuum pan *G*, where it is concentrated to a dry matter content of 60 % by means of steam at 60-70° coming out of the vacuum.

The cylinder *H* catches any whey which may have been carried away in the steam. The thick syrup is run from *G* into the small crystallisation vats contained in the cooling tanks *N* and after complete crystallisation the mother liquor passes into the centrifuge *O*. The quantity of sugar obtained is about 3.8 % of the whey and corresponds to 75-80 % of the total lactose. The mother liquor and lactose obtained have both a brownish colour due to partial caramelisation. To remove this the crude product is dissolved at *P* in 3 times its bulk of water, adding 0.2 % acetic acid, animal char and magnesium sulphate, then the solution is heated to about 90°, albuminous matter still separating out. The solution then passes into the reservoir *Q*, then into the filter-press *R*. The clarified syrup passes into the container *S* and from there into the vacuum pan *T*. It is crystallised in the centrifuge *V*. The pure lactose obtained is then dried in the vacuum *X* from which it is drawn out by the pump *W* into the mill *Z* and separated from the larger grains by the sifter *Y*.

Another system is given by VOLKMAR HÄNIG & Co. (fig. 2). The whey is heated in a large tank *A* by passing in steam till the albumen separates in large flakes. The liquid containing the precipitate is driven by the pump *C* into the filter-press *D*, from which it runs into the receptacle *E* below, while the albuminoid mass can be removed as soon as it has formed solid cakes in the compartments of the filter-press. The filtrate condenses alternately in the two vacuum pans *F*, from which it flows as soon as it is sufficiently concentrated into the refrigerator chambers *L* where the lactose crystallises out. The crystals are dried in the centrifuge *M* forming crude, impure lactose. The crude lactose is redissolved several times in *N* and repeatedly boiled in *O* with the appropriate chemicals; the impurities are removed in the filter *Q*, the syrup concentrated in the vacuum pan *S* and crystallised in *L*. The molasses are separated from the crystals and the latter are dried on warm plates in

the vacuum chamber *U* by means of the air pump *V*, ground in the mill *W* and passed by means of the elevator *X* on to the sieve *Y* to obtain the required product.

It seems that the D. R. P. 423,629 of the 'Graf Schwerin-Gesellschaft' presents some economic advantages. The albumen rendered insoluble by acid is precipitated with clay, kaolin, etc. and eliminated by filtration; the lactose is separated from the filtrate by dialysis and by evaporating to dryness the dialysed liquid nearly the whole lactose content is obtained. By this method repeated crystallisation (refining) is avoided, because the dialysed syrup contains no impurity provided that dissolved salts have been previously precipitated by chemicals.

Defects. — After the long and complicated preparation of lactose certain defects are still often detectable in the final product. The most important are over large grains, excessive moisture, yellowish colour, organic impurities and the presence of salts of the heavy metals. Excessive moisture and lack of fineness of the grains are due to insufficient care in manufacture. The yellow coloration may be attributed to either faulty washing or drying at too high a temperature. Organic and inorganic impurities result from the use of unsuitable filters.

III. USES OF LACTOSE.

Refined lactose is used in pharmacy for a number of preparations, the most important of which are:—

(1) Milk sugar — refined lactose readily soluble and less hygroscopic than ordinary lactose.

(2) Milk sugar + cacao — diatetic mixture of milk sugar with 25% of pure cacao.

(3) Iron + milk sugar + cacao — like no. (2) with a high content of readily digestible iron.

(4) 'Liebig broth' — an infant food and tonic rich in maltose and vitamins.

The use of lactose in patent foods is spreading. The addition of small quantities of lactose in baking and in biscuit manufacture, in diatetic products, etc. considerably enhances the food value.

In the preparation of certain beverages such as 'kummel', lactose is used to obtain the 'crystalline' quality; the lactose syrup is poured into alcohol and a deposit of crystals is formed on the glass of the bottles.

Lactose is used in the manufacture of the finest quality chocolate, to which it gives a special flavour, and for the coating of sugared almonds. It is used also in the preparation of olives, citrons and other preserved fruits, and to increase the content of fermentable sugar in olives for oil extraction by the microbiologic method of DELBRUCK with *B. lacticus*.

In the jam industry lactose can profitably replace the more readily fermentable sugars. It plays an important part in the preservation of certain fruits already slightly acidulated, and in keeping the firmness of soft fruits such as cherries, strawberries, etc., by forming small quantities of lactic acid which increases their resistance to preservatives (alcohols, vinegar, etc.) and diminishes discoloration.

Small quantities of lactose (1-2 %) can replace salt, saltpetre, etc., in preserving the flavour, colour and consistency of the products of pork butchery. In preserving meat both lactose and the small quantities of lactic acid which form present as great or even greater advantages from a sanitary standpoint as nitrites, which cannot be entirely recommended.

Lactose is used also for preserving oilcakes (coconut, sunflower, grapeseed) containing readily fermentable oils and fats. A slight lactic fermentation is produced

which protects from oxidation by preventing the development of oxidising lipases such as olease and makes the cake more appetising and digestible.

Lactose is used for starting and accelerating the development of certain types of lactic fermentation in ensilage.

Lactose can serve as an excipient for the concentration of juices (orange, lemon, etc.) *in vacuo*, and for reducing and preserving oxydisable essences.

Other uses. — Lactose is used for preserving the latex of rubber, etc. on account of its reducing action and because it opposes resinification. It can be used as a reducing agent for bleaching and in industrial microbiological retting with pure or mixed cultures and specially with anaerobic retting bacteria.

Lactose is used in soap manufacture for stabilising natural organic colours such as that of chlorophyll and for preserving the emulsion and transparency.

It serves as a reducing agent in the making of mirrors, 'thermos' flasks and 'thermo-ionic' valves, and as a stabiliser in the manufacture of explosives (nitro-lactose).

* * *

In résumé it may be said that the lactose industry has not undergone important changes in recent years. The machinery, it is true, has been improved, but the method of preparation has remained practically stationary for 30 years. The two chief difficulties hindering the industry from real economic success, namely, costly evaporation and transformation into lactic acid, still await solution, and it is only by a successful elimination of these drawbacks that the present crisis in lactose manufacture can be averted.

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E. GASSER.

Notes.

Industries of Plant Products.

UTILISATION OF RICE HULLS. — The problem of the profitable utilisation of the large quantities of rice hulls annually available is being considered in Italy.

By dry distillation 60 % of liquid products are obtained containing acetic and propionic acids, furfural, phenols and cresols which can be separated and used.

The coke obtained has a certain value as a decolorising char. The ash contains 3.15 % K_2O and 93.95 % SiO_2 .

Their value is recognised in the glass-making industry. Bacterial decomposition of the hulls with the formation of alcohol and inferior fatty acids constitutes another method of their utilisation. (*Les Produits Coloniaux et le Matériel Colonial*, No. 81, 1931).

BANANA FLOUR AS A FOOD. — In a thorough investigation of the use of banana flour M. R. LECOQ shows that, in contradiction to recent statements on the subject, if the flour is suitably produced it is particularly adapted for use as a food for infants and invalids and for the treatment of certain diseases, such as nephritis, arthritis, etc. Its average composition is: — water 3.18 %, protein 4.25 %, lipoids 0.67 %, glycides 85.82 %, ash 1.18 %. (*Annales des Falsifications et des Fraudes*, no. 265, 1931).

VITAMINES IN SUGAR CANE JUICE. — According to recent research sugar cane juice is particularly rich in vitamin A and also small quantities of vitamin D. Juice obtained by extracting trash is richer in the anti-neuritic vitamin than the ordinary juice. Thick juice and molasses contain also appreciable quantities of vitamin B. (*Journal of Agricultural Research*, vol. 41, no. 10, Washington 1930).

THE CANNING QUALITY OF CERTAIN PEACHES IN THE EASTERN UNITED STATES. — Investigations on this subject have been made by W. C. CULPEPPER and S. I. CALDWELL. They find that in all the varieties studied the development of full characteristic flavour is delayed until the fruit has become fully ripe and rather soft. The increase of palatability is due in part to progressive increase in total sugar and decrease in acidity and astringency, in part to progressive formation of the characteristic flavouring substances and in part also to solution of the middle lamellae of the cell walls. When fruit is removed from the tree at any stage of maturity prior to the full soft-ripe stage, the fruit never attains the full rich flavour characteristic of the variety when ripened on the tree.

The resistance offered by the unpeeled flesh to perforation by a blunt needle 0.032 of an inch in diameter was found to be a dependable measure of the stage of maturity. The rate at which softening of the flesh to the pressure test occurs is a dependable index of the rate at which the other changes constituting the ripening process are occurring. Consequently this pressure test is one very satisfactory guide in determining the proper stage of ripeness for canning.

Great care must be exercised to pick the fruit at a stage of maturity in which colour and flavour are sufficiently developed.

The fruit should be canned the same day it is picked, unless cold storage at 32°F. is available. Fruit held in storage at 32°F for 15-30 days retains its firmness and appear-

ance, but is somewhat deficient in flavour as compared with fruit canned directly from the tree. (*United States Department of Agriculture Technical Bulletin No. 196, 45 pp., Washington 1930*).

E. G. & G. S.

THE PINEAPPLE INDUSTRY IN THE HAWAIIAN ISLANDS. — The cultivation of pineapples and the dependent industries have developed to a surprising extent in the islands, specially since 1912, when the Association of Hawaiian Manufacturers of Pineapple Conserves was formed.

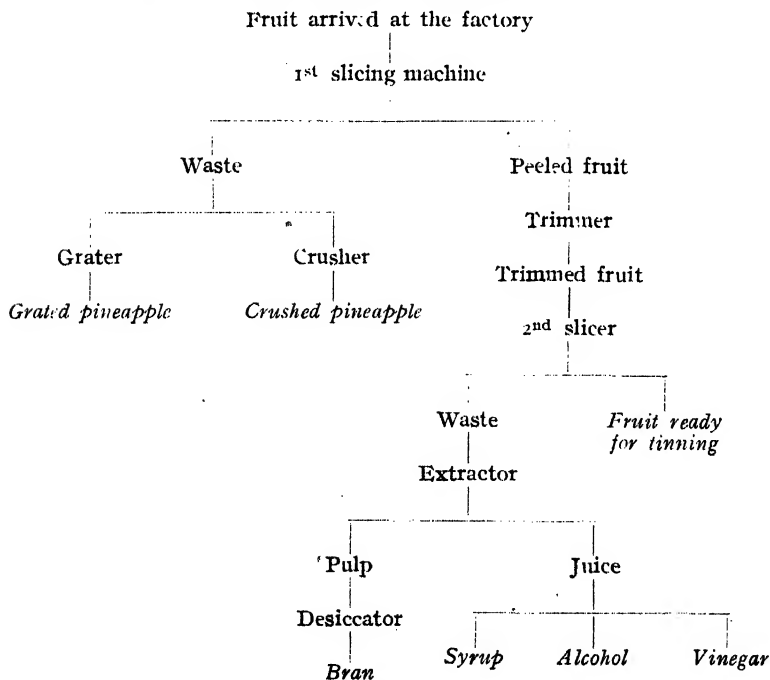
The method of cultivation is simple. The pineapples are grown under a paper mulch. The fruit forms 14 to 18 months after planting and ripens 4 months later. The plant will continue growth almost indefinitely, but not more than 3 crops are taken from the same plant to avoid degeneration of the fruit. There are two cropping seasons, the first and most important from June to September, and the other at the end of March. Propagation is by suckers and crowns.

The preparation of the conserves requires complicated plant and a large number of workers. On arrival at the factory the fruits are passed into a slicing machine which removes the rind down to the root of the 'eyes'. The ripest parts of the fruits are removed to two other machines which reduce them to 'grated' and 'crushed' pineapple respectively.

The remainder of the fruit after being trimmed passes to another slicing machine.

The waste from that is extracted, the juice being made into syrup, alcohol or vinegar, and the pulp being dried to form a feed for fattening stock. The fruit is put in tins, cooked by the APPERT process and sterilised.

The various operations may be represented diagrammatically as follows :—



(From L. KUENTZ, *La Cochinchine Agricole*, no. 10, 1930).

J. L.

HARD OILS FOR MARGARINE. — The hard oil obtained from peanuts and sunflower (melting point between 32 and 34°C) lend themselves particularly well to the preparation of margarine. They have also the advantage over coco-butters of a greater stability. (*Bulletin des Matières Grasses*, no. 8, 1930).

PLASTIC MATERIAL OBTAINED WITH SICCATIVE OILS. — Italian patent no. 269261 of 14 November 1929. — By submitting siccative oils, such as cashew apple oil, to the action of an oxidising agent, with or without an acid (HNO_3 , formaldehyde alone or mixed with HCl , etc.), plastic products are obtained which when dissolved in organic solvents are suitable for the preparation of liquid gums, varnish, insulating material, substances for impregnating cloth, etc.

UTILISATION OF SISAL AND ITS WASTE PRODUCTS. — The extended cultivation and exportation of sisal, particularly in British East Africa, have led the Sisal Planters' Society to carry out investigations concerning the use of sisal to replace jute and artificial silk. Experimental alcoholic extraction of large quantities of sisal waste (fresh 4-year-old leaves contain 3.4 % sugar, 3.6 % recoverable fibre and 8.4 % cellulose residues) has not given very satisfactory results. It is hoped to be able to recover the fibre remaining in the waste.

Industries of Animal Products.

THE BACTERIAL FLORA OF MILK AND OF THE AIR OF THE COWSHED. — It is known that milk may be easily infected with germs carried in the air of the shed and that this may be prevented either by preventing contamination or by destroying the germs with disinfectants. Suitable disinfectants must be cheap, readily sprayable, inoffensive to men and cows and harmless to milk and its products.

As regards all these points it is safe to recommend both KAPFF's acid and a 5 % aqueous solution of formulsine. The former reduces the total germ content of the atmosphere by 75 %, the latter by 77 %. Either disinfectant thus will reduce the bacterial flora in the air of the cowshed to one-quarter.

IRRADIATED MILK. — According to recent experiments irradiation of milk by the SCHOLL method increases its coagulating capacity by 30 to 40 % and makes it capable of completely curing rickets (in mice) due to a vitamin D deficiency. Irradiation by the HOFFMANN method, on the other hand, does not increase the coagulating power of milk or its efficacy against rickets.

GRADIN ARTIFICIAL CREAM. — 'Gradin' is from a technical standpoint a successful imitation of cream. In it milk fat is largely replaced by peanut oil. Whole milk is used for emulsifying the oil, so that 'Gradin' contains all the constituents of milk in practically the same proportions as in natural cream. It has, however, defects in flavour, appearance and in frothing when whipped. (*Milchwirtschaftliche Forschungen*, 1930, Bd. 10, pp. 350-368).

PHYSICAL AND CHEMICAL RESEARCH ON 'WOOLLY' GRUYÈRE CHEESE. — Investigations made by G. KOESTLER at the Institute of Dairying and Bacteriology at Liebefeld (Berne) have shown that 'woolly' cheeses are distinguished from normal cheeses by an intense deacidification starting from the rind, and he thinks he can affirm, moreover, that the formation of the typical Gruyère aroma is directly related to this process of deacidification. Analyses of 3 'woolly' Emmenthal cheeses showed that the one-sided formation of cracks ('laines') in a cheese is caused by an unequal density of the curd. (*Landwirtschaftliches Jahrbuch der Schweiz*, Bern 1930, pp. 439-462).

Miscellaneous.

"ENTE NAZIONALE PER L'ARTIGIANATO E LE PICCOLE INDUSTRIE". — The Italian Office for the Protection and Commerce of Medicinal and Aromatic Plants. This Office has for some time been actively improving the rich and varied flora of Italy as regards such plants.

From time to time meetings (National Meeting of 1928) and Congresses (International Congress of 1929) have been arranged. The Office also exhibits at the various Sample Fairs and fairs commercial Offices (Berlin, etc.) which endeavour to recapture the lost markets and to improve the national produce.

The Office publishes annually complete lists of aromatic, medicinal and similar plants with instructions concerning gathering them; the lists are subdivided according to the part of the plant utilised (leaves, flowers, fruits, roots, bark, etc.).

The list for 1931 includes 96 medicinal and aromatic herbs, 44 plants of which the leaves are used, 38 of which the flowers are used, 43 of which the roots, bulbs or rhizomes are used, 5 of which the seeds are used, 22 of which the fruits are used, 10 of which the bark is used, 4 of which the buds are used, 6 of which various parts are used and 8 medicinal fungi.

The office also undertakes the periodical publication of general reports (statistics, etc.) on the production, organisation and sale of the products of tree cultivation in different countries. (Communication from the 'Ente Nazionale per l'Artigianato e le Piccole Industrie').

XIIIth FAIR AT PADUA, ITALY (6-29 JUNE 1931). — This Fair, which is of international importance, includes the exhibition of the usual groups of merchandise, such as Foodstuffs, Agriculture and Agricultural Industries, Domestic Economy, Heating, Electricity, Small Industries, Fabrics, Chemistry, Physics, etc.

Certain special exhibits will be particularly developed, notably: — (1) the "Bottega del Vino", an exhibit with many prizes in which will compete all the typical Italian wines and those worth recognition and wider distribution — (2) the poultry and rabbit exhibit — (3) the modern animal husbandry exhibit — (4) the exhibition of the competition for a plan for a model rural house — (5) the great exhibit of the agricultural and machine industries — (6) forestry exhibit — (7) exhibits of homespun, radio, etc.

Numerous cash prizes as well as silver and gold medals and diplomas are awarded. (Communication from the Committee of the Padua Fair).

E. G. & G. S.

ANIMAL HUSBANDRY

Notes.

RESULTS OF THE SECOND ANNUAL GENERAL MEETING OF THE EASTERN CANADA SOCIETY OF ANIMAL PRODUCTION, 1930. — The Proceedings of this meeting, which recently have been issued and summarized in *Scientific Agriculture* (January 1931, Vol. XI, No. 5) contain some interesting papers and conclusions.

C. F. BAILEY reports on the pasture rejuvenation work at the Fredericton Station. He emphasizes (1) the application of a balanced fertilizer for best results in pasture improvement, stating that the application of fertilizer may be increased annually as the pasture improves in fertility and productivity; (2) the importance of close grazing. The aim should be to have a June grass condition throughout the entire pasture season; (3) harrowing as an essential part of the pasture improvement programme; (4) a rotation of pastures, which has to be modified to suit the situation on each farm.

In a report on Cross Breeding of Swine W. R. REEK states that this has long been believed to increase the vigour of the offspring and the ease and cheapness of production. Experimental evidence has not been available, however. He reports on the results of experiments undertaken on this subject by a number of stations in Canada, showing that an average of the costs of production of all the purebreds as against the crossbreds in the tests shows so small a difference that it may be eliminated for practical purposes. In most cases the crossbred hog was reported as being more thrifty and an earlier maturing animal, but the pig which may produce a pound of pork cheaper may be however not the most profitable, because quality of the finished product cannot be overlooked. Throughout the quality of the crossbreds was lower than of the purebreds. Perhaps some breeds cross to greater advantage than others and undoubtedly this is true from the standpoint of a quality product.

The report of the Horse Committee, presented by C. M. McRAE deals with the absence of advertising for horse power. All horsemen should join together irrespective of breed and advertise horse power; horse advertisers should be appointed in each Province, just as manufacturers are advertising mechanical motor power.

The Beef Cattle Committee states that there is need for investigational work to determine the practicability of raising feeder cattle in the East of Canada instead of continuing to rely largely upon Western Canada as a source of supply.

The report of the Dairy Cattle Committee deals primarily with the importance of mineral deficiencies in dairy rations and with the investigation work undertaken on this subject.

The report of the Sheep Production Committee communicates the results of different services for the improvement of sheep breeding, such as the ram grading service and the

commercial wool grading. A large number of breeders made application for fleece identity tags and when their wool was shipped for grading the individual fleeces were weighed and graded separately. This made it possible to indicate to purebred breeders those ewes which graded too low for the breed, those which were light in weight or those which carried black fibres.

The Committee on Swine reports the principal problems of swine breeding in Canada and states that there is need for much more study of breeds, strains and the pig as breeding unit, for specific information concerning the limits to which the pig might be regarded as a concentrator for various mineral substances in their raw state, and these mixed with various ingredients and sold as mineral supplements. There may be also a need for review of the whole question of cross breeding in swine and the effect of such practice on market type and economy of production generally.

FEWER LIVESTOCK SHOWS IN ENGLAND. — According to the *Live Stock Journal* there is a marked reduction of the smaller shows of stock animals in England. Improved transport facilities enable visitors to disregard distance and exhibitors to send their animals to greater distances. Thus there is a loss of interest in the local shows and a tendency to amalgamate them into more important exhibitions.

Geographic Aspects.

STOCKBREEDING RESEARCH EXPEDITION TO THE ALTAI. — As reported previously (see this *Bulletin*, 1930, No. 11, p. 425) the Siberian Academy of Omsk organised an expedition under the leadership of Prof. W. AMSCHLER to make a close study of stock breeding conditions in the Altai Mountains, which had not previously been attempted.

The study of the horses showed that the Altai breed has little relationship with the wild horse but is nearer akin to the purebred Tarpan. In the neighbouring regions of Mongolia the horses seem to have acquired Przewalsky blood by way of the Mongolian horses.

The most frequent type of cattle was found to be the Siberian, the cattle thus appearing as little aboriginal as the horse. Prof. AMSCHLER carried out about 500 tests of milk yield and fat content and found that in the primitive breeds the daily yield of milk and its fat content are highly variable. A study was also made of the relation between altitude and the fat content of milk which showed that other conditions being equal Altai cows give a milk containing 1 % more fat than the cows of the Siberian steppe.

Yak breeding was also studied, including the dairy value of the females in semi-wild herds. During a lactation period of 6 to 7 months the average daily milk yield was 2.73 kg. with a fat content of 6.009 %. In the hybrid between yaks and cattle the milk yield and its fat content were found to be intermediate between those of the cow and the yak.

It was not found possible to establish a certain relationship between the wild sheep in the Siberian Altai region and the common domestic sheep by means of craniological observations. The Altai flocks show a strong Mongolian influence.

The investigations concerning goats in the Altai proved particularly interesting for three distinct species were found living in flocks. The milk yield of the Altai goat is medium (4 kg. a day), but the milk contains up to 8 % of fat.

The absence of horns in horned animals is frequent. (*Fortschritte der Landwirtschaft*, Berlin-Wien, 1931, Heft 3).

Horses.

NEW RESEARCH ON INHERITANCE OF COAT COLOUR IN HORSES. — CSUCKS has directed research on this subject in the stud of the Gidran breed (Mezőhegyes, Hungary). The material studied includes a pedigree of coat colour extending over 8 generations of 60 stallions, with notes of the most remote ancestry, and 14 maternal lines still living, 7 extinct, and 689 mares. There are records of 8741 services. The results show that chestnut colour is recessive. It appears that coat marking may be independent of heredity. (*Mezőgazdasági Kutatások* 1930, nos. 5 and 6).

Cattle.

INTRODUCTION OF THE 305 DAY TEST FOR PUREBRED DAIRY COWS IN NEW ZEALAND.

— The Dairy Division in Wellington is now accepting entries for a new class of cow testing, the 305 day section of the Certificate-of-record test. The Dairy Division was requested to inaugurate this test by a resolution passed at a meeting of the New Zealand Jersey Cattle Breeders' Association, held last June. New Zealand breeders were no doubt influenced by the trend in the United States, where, particularly with the Jersey breed, there is a distinct tendency for the 305 day class to take the position previously held by the full year test. The 305 day class will continue in New Zealand as in the past and will receive support from the majority of the specialized breeders of purebred dairy cattle, while the 365 day class, as it is hoped, will swell the C. O. R. (Certificate of record) entries by way of opening up an avenue of activity for those farmer-breeders who find the yearly test inconvenient for their purpose. (*The New Zealand Journal of Agriculture*, Wellington, 1930, Vol. 41, No. 2).

EFFECT OF INTERVAL BETWEEN TWO MILKINGS. — *The Imperial Institute of Animal Husbandry and Dairying in Bangalore, India*, carried on some tests on the effects of interval between the morning and evening milking on the quantity and quality of milk. The results of these tests are interesting and deserve some consideration: 1. By keeping equal intervals between the two milkings the outturn of milk and fat at each milking remains practically the same, although there is a little increase in fat percentage in the evening which may be attributed to the activity of the fat secreting cells during the day time. 2. The total quantities of milk and fat for the whole day remain almost constant, irrespective of the interval between milkings. This fact is of great importance from a practical point of view. 3. By keeping an unequal interval between the two milkings one can get more milk with the longer interval and richer milk with the shorter interval and can thus arrange the supply of fresh milk and its products according to the local demand. (*The Journal of the Central Bureau for Animal Husbandry and Dairying in India*, October, 1930, Vol. IV, Part. III).

AN INTERESTING CASE OF QUADRUPLE CALVING. — A careful study of the 4 calves born at the same time from a single cow (F. B. HUTT, *Journal of Heredity*, Washington D. C., August 1930) revealed the following facts. Two female calves showed an inverse asymmetry in their coat markings, i. e., one was the mirror image of the other. At the age of 13 days their weights differed by less than 454 gm. The author considers these two calves as monozygous, and the two others (one male and one sterile female) as dizygous.

EXPERIMENTAL PRODUCTION OF BABY BEEF IN GERMANY. — With a view to satisfying a change in the requirements of consumers the Berlin Veterinary College and the Agronomic Institute of Halle University tried fattening young cattle. Fattening bullocks for slaughter at the age of 12 to 13 months was found satisfactorily remunerative. It was not found economical to be sparing in the feeding of animals for baby beef purposes during the first months of fattening. Grazing with supplementary rations of concentrates seemed most satisfactory. Highly digestible food is essential, and sufficient mineral matter is important. The experiments are not yet completed but provisionally, the following quantities of digestible protein are stated to be necessary in the ration:—

For bullocks weighing	250 kg	450-500 gr. per day
”	”	”
”	300 kg	700 ” ” ”
”	”	”
”	400 kg	900-1000 ” ” ”
”	”	”

MARKING MEAT IN ARGENTINA. — In a recent decree the Argentine Ministry of Agriculture has ordered the marking of meat produced in the country; that intended for home consumption must bear a differently coloured stamp from that for export. In every case the place of origin of the animal must be shown on a veterinary certificate issued in the locality. The decree contains precise instructions regarding the marking regulations. (*Anales de la Sociedad Rural Argentina*, Buenos Aires, 1930, Año LXIV, Vol. LXIV, No. 17).

Sheep.

COMPARISON OF THE WOOL VALUE OF RAMS OF VARIOUS FRENCH BREEDS. — The Wool Research Laboratory of *l'Union Ovine* has carried out comparative studies on the growth and wool characteristics of certain French breeds of sheep. As regards rate of growth the Ile de France sheep were found much superior to the others (110 gm. per diem, as compared with 79 gm. for Rambouillet merinos, 87 gm. for Crau merinos and 44 gm. for the Caussenarde breed).

Wool tests gave the following results :—

Breed of rams	Mean finenesses in μ	Yield (Percentage of washed to unwashed wool by weight)	Coefficient of elasticity	Resistance in mg. per μ^2
		%		
Crau Mérimos	18.8	40.1	55	17.5
Rambouillet Mer nos	18.0	35.6	62	20.2
Ile de France	28.0	58.8	50	15.0
Caussenarde	32.9	52.1	41	18.3

THE FIRST WOOL CONTROL SYNDICATE IN FRANCE. — Breeders of Ile de France sheep recently formed a wool control syndicate with the purpose of obtaining breeding stock with an abundant fleece of superior quality. It is in collaboration with the Ile de France Flock Book and undertakes wool testing in accordance with its regulations. (*L'Union Ovine*, 1931, no. 3).

IMPERIAL WOOL CONFERENCE, LONDON, SEPTEMBER 1930. — A considerable number of papers were presented to this conference. Dr. S. G. BARKER in a paper on the "Scientific Correlation between Wool Producer and Manufacture" emphasized the difficulties of the manufacturer in dealing with wool, in the production of which he had no part or interest, and also those of the producers, whose interest in his product ceased as soon as the wool was sold. He stressed the necessity for creation of co-operative work on the part of scientific research institutions, which would cover the fields of both fleece production and wool manufacture.

Following Dr. BARKER'S paper accounts were given of the work relating to wool in progress in Australia, South Africa, New Zealand, Canada and Great Britain. (*Quarterly Bulletin of the Imperial Bureau of Animal Genetics*, No. 4, October 1930).

Goats.

THE MOHAIR INSTITUTE, CHICAGO. — An organisation which has recently been formed under the direction of A. C. CAGE (Director of the Angora Journal) with a view to improving Angora goats' hair and studying marketing problems (*L'Union Ovine*, 1931, no. 3).

Pigs.

POWDERED SKIMMILK FOR WEANLING PIGS. — During a trial made at the Macdonald College, Quebec, Canada, by E. W. CRAMPTON a basal feed of corn and middlings supplemented by 30 % of powdered skimmilk produced average daily gains on weanling pigs of 1.54 lbs. per pig as compared with a basal feed supplemented by 30 % of a tankage-fishmeal-oilmeal-mineral mixture with which average daily gains of 1.42 lbs. were obtained. An average "net difference" in favour of the powdered milk of 1.3 lbs gain per 100 lbs of feed eaten was realized. As fed in this trial the powdered skimmilk mixture was 2.9 % more efficient in producing gains on pigs for the first month after weaning than was the check ration. (*Scientific Agriculture*, Ottawa, Canada, February 1931, Vol. XI, No. 6).

WHEAT AS PIG FEED IN AUSTRALIA — Two articles in the *Journal of the Department of Agriculture of Victoria* (January 1931, vol. 29 part 1) are devoted to advocating the keeping of pigs on wheat farms. Experiments on the Government Farm at Rutherglen have showed that with the present low prices wheat can profitably be marketed as a pig feed, particularly damaged wheat which cannot be sold at higher prices.

Poultry.

PROGRESS OF EGG PRODUCTION IN NORWAY. — From the end of the war until 1923 Norway produced insufficient eggs for home requirements and her imports amounted to 20 million marks. Since then the rational agricultural policy followed not only made the country independent of foreign eggs but in 1925 made possible an export of 7 tons of eggs to England. The 3 following years conditions were less favourable and the production was just sufficient for home consumption. Since December 1928 Norway has exported eggs regularly and seems likely to maintain the supply. (*Deutsche Landwirtschaftliche Tierzucht*, 1931, Nr. 10).

Bee Keeping.

IMPORTANT BEEKEEPERS' MEETING IN TORONTO, ONTARIO, 1931. — In February the American Honey Producers' League, the American Honey Institute, the Apiary Inspectors of North America, the Ontario Beekeepers' Association and the Ontario Honey Producers' Co-operative Co. Ltd. held a joint convention at Toronto, Ont. A number of very interesting reports on different beekeeping subjects were delivered. (*The Beekeeper*, 1931).

F. M. & S. T.

FORESTRY

Integral reclamation schemes for mountainous areas in the Mediterranean basin, with particular reference to Italy. (Part 2, Concluded) (1).

The same problems of providing habitable conditions and of improving the existing processes of production occur for any territorial unit of integral land reclamation whether it be a mountain area or an area of plain lands.

In both cases the intention is to exploit natural resources not as yet utilised for agricultural purposes or to utilise to better advantage resources that are not as yet systematically exploited, there being also the common object of making a more orderly distribution of the excess population by placing any shifting of agricultural labour on an sufficiently durable basis.

At the same time the actual conditions of working out these principles are quite different for a mountain and for plain areas respectively.

On the plain lands and gently sloping hills preparation for habitability is solely concerned with marshy or unhealthy areas or with large properties where cultivation is of an extensive character (*latifundia*), these cases being thus exceptional to the general land reclamation rules for other plain areas where the main question is the transformation or improvement of existing production processes.

On the other hand, in a mountain district and more particularly in its higher parts, and lower sections of steep elevation, preparation for habitability covers large continuous areas wherein the deep-seated ill-coordinated character of the water and geological system only permits forms of utilisation which are not really remunerative.

Whereas on the plain lands the object is to recover new soils, generally fertile, for purposes of agriculture, in a mountain area on the other hand a necessary factor in bringing about habitability consists in the maintenance of the stability of the soils which is a highly costly business. In the one case extensive hydraulic work and complete schemes of land transformation are carried out in areas at present

(1) See for Part 1 of this article *Monthly Bulletin of Agricultural Science and Practice*, No. 3, pp. 115-119.

unpopulated and it is only after this drainage and transformation work has been accomplished that there can be any influx of an agricultural population ; in the second case the main object is to maintain the stability of the soils while reducing to a minimum any displacement of population.

At the present time it is clearly recognised in Italy that, as regards the integral land reclamation of a mountain area, mechanical restoration is more important than improvement in production. This general reconditioning is in fact a local public necessity and at the same time a necessity of more than merely local importance, having regard to the influence of the mountains in the general direction of the water system.

In integral land reclamation schemes in Italy improvement work in the mountain area is rightly considered to be a necessary preliminary condition for improvement work on the plain lands (1).

The above statement has often been understood in too limited a sense and it has been considered in Italy that it might be possible to carry out a certain sufficient degree of improvement work on a mountain area as regards stability by confining attention to those particular sections which had shown themselves to be most liable to physical deterioration, and by limiting at the same time the extent of new works of clearance.

It has now been recognised that by this policy improved conditions were only brought about very slowly and incompletely and that the conditions of life for the mountain population derived but little advantage, the chief gain being a form of indirect protection to certain parts of the plain.

The technical staff of the Forestry Militia have carried out adequate enquiries regarding the distribution of mountain crops, the conditions of ownership and the division of holdings, and also the state of production in relation to local resources and their work has shown that the forest and pasture resources of the higher parts of the mountains are not adequately exploited.

Their work has also shown that, as regards the middle slopes and often also in the lower mountain lands (" fascia pedemontana "), the natural resources of the soil were as a rule poorly utilised mainly because they were planted with unsuitable varieties of crops.

The mountains in the Mediterranean basin, with their mild climate, can as a rule, be used to advantage for agricultural purposes even at quite considerable altitudes. Because however of their general steepness, special attention has to be paid to the necessity for maintaining the soil on any cleared areas in a good condition of stability before making the clearances required for putting the land under permanent conditions of cultivation.

In default of due attention to this question of soil stability, primitive utilisation for purposes of pasture, at various times, has been replaced by a bastard and shifting form of agriculture, from which it was hoped that it might be possible to derive a considerable variety of agricultural products without considering whether the mountain soils were even really capable of being utilised profitably in this way.*

This change-over, as it was not the result of the efforts of the mountain population, would only have had a limited effect if the excellent working of nature had not at different periods been violently upset by invasions of the mountain side by the inhabitants of the plain lands. Historical events have sometimes tended to accelerate the tendency to desert the plain lands, while in other cases, on the con-

(1) A. SERPIERI (Under-Secretary of State for Internal Land Reclamation): The Law on Integral Land Reclamation in the first Year of its Application, Rome 1930, Istituto Poligrafico dello Stato.

trary, conditions of habitability in the plains have tended to slow down the current of migration.

At the present time Italy is passing through a period when its mountain lands are the object of ill-coordinated activities coinciding with a marked development of the agricultural population in the plains. In these specially difficult conditions it is coming to be recognised that the physical or mechanical re-establishment of stable conditions on the mountain must become the general rule and that this cannot be brought about with reasonable regard to economic considerations except through a systematic and simultaneous utilisation of all the existing natural resources.

In this connection the part played by the State consists in aiding all forms of activity concerned with the production of the land, it being considered that any general or special form of re-establishment work is a means of arriving at a lasting improvement in production.

Naturally it is necessary also in the first place, and as speedily as possible, to bring about direct improvements in the normal and material condition of the inhabitants of the mountain-side so that they may the better appreciate the advantages of settled conditions. The purely mechanical forms of re-conditioning, which consist in controlling torrents and in effecting, as regards waters and soils, a proper systematisation of slopes liable to erosion, will be carried out wholly at the State charges. In such cases re-afforestation can only be considered as a means for maintaining the restored balance.

There are, however, extensive areas now abandoned by the inhabitants after a prolonged and destructive kind of exploitation, and wholly laid bare by clearance work, and lastly, rendered incapable by exhaustive pasturing of any possible improvement. Such areas can no longer be utilised for agricultural purposes and it would, moreover, be impossible to restore by any mechanical means any adequate degree of fertility to such lands. They, however, still lend themselves to future use for forestry purposes and, in spite of the heavy expense required to carry out re-afforestation in such difficult conditions, the State is prepared to encourage local enterprise in re-afforestation by the grant of heavy subsidies in the interest of the national timber requirements. Only in cases where such efforts prove ineffective will the State carry out on its own account the work of re-afforestation and incorporate the re-afforested lands in the State forest demesne.

Where the lands are already used for purposes of agriculture the State recognises that it is its duty to control systematically the use of the soils according to their true capacities. It is not considered necessary to encourage large farming undertakings or that large capital sums should be invested in agriculture. By a better control of the parcelling of a landed estate, it is hoped to establish medium and even small size farms which seem to be the best adapted to existing conditions. The work of the present inhabitants should be fully utilised and they should be assisted by technical advice on agricultural questions and also with such financial assistance as may be required for making practically the requisite transformations.

For reasons which have been already explained, the territorial unit for the improvement of a mountain area, which should logically correspond to a definite corresponding area of plain land requiring its protection, cannot, in a majority of cases, be strictly kept within the limits set either by orographical or purely administrative conditions.

The necessity for reducing the shiftings of population to a minimum, the continuity of natural plant growths which are both a source of production and also a means of protection, the type of ownership, the actual purposes of integral land

reclamation schemes, which are not intended necessarily to increase the extent of agricultural exploitation, but rather to intensify it in appropriate soil conditions, all these elements provide sufficient reasons for avoiding any preliminary limitation based on orographic or merely administrative considerations.

The correspondence of the perimeter of a mountain land improvement scheme with the perimeter of a definite territorial unit of improvement works on the plain will in any case be obtained in practice since the whole of the mountain area concerned will be subject to the scheme of improvement.

Regarding the matter from a different but not less important angle, the intention of this freedom as regards the previous determination of the territorial unit to be brought under a scheme of mountain improvement is to avoid reverting to any indirect form of bureaucratic State intervention. On the contrary, it is desired to retain for the State a direct intervention of a political and social character on as wide a scale as possible.

In a mountain district the spirit of co-operation for purposes of production is still very little developed, because of the particular type of farming which has for a long period determined the type of agricultural production; hence the whole economic nexus has to be reconstructed.

The complex and far-reaching work of utilising the natural resources of the mountain must include solutions of its special problem which will facilitate the gradual establishment of a suitable type of mountain agriculture in such places as are best adapted for the purpose.

Work has already been carried out on the control of torrents, the stabilisation of crumbling slopes and the regulation of pasturage, while at the same time there is an increasing development of re-afforestation work carried out directly by the State.

With the improvement of pasturing it is hoped not only to develop stock production and to obtain a better return from land, but also to relieve the wooded areas of the excessive pasturing to which they were liable with highly detrimental results for any plans for forest regeneration.

Because of the dryness of the climate, forest regeneration in the Southern Mediterranean area is a particularly difficult matter and special attention has to be paid to any conditions that interfere with normal regeneration processes. It may fairly be said that in dry climatic conditions the difficulties in the way of regeneration schemes are a serious obstacle to the future development of forestry work.

In existing forests special emphasis must be laid on the application of sound principles of management and maintenance.

Communes and other public bodies may prepare the schemes of forest management for their own woodlands but the State can always act on behalf of any administrative body that is not prepared to carry out this work. As regards forests in private ownership which are under the regulations for a limited exploitation with a view to the hydro-geological protection of an area, the owners have full liberty to settle the scheme of management and treatment of their woodlands. They are only required to observe any local regulations which have special reference to the due safeguarding of regeneration work.

It is only by degrees that the emphasis laid on technical advice, and more particularly a proper organisation of the market for forest products on which price variations are kept within narrow limits, will induce the owners of privately owned forests to carry out modifications in their system of management such as will bring the quality of their products into closer conformity with the national requirements of the industries by which they are utilised.

As regards the re-afforestation of lands not as yet put to agricultural uses or which may have gone out of cultivation, two points of view call for consideration, the one objective and the other subjective.

Objectively the increase in the wooded areas is for Italy, as for other countries, a real necessity to enable it increasingly to free herself from timber imports. On the subjective side, it is to be noted that private enterprise is not specially anxious to devote much attention to forest production and is glad enough to avoid locking up capital for any lengthy period.

Moreover, the problem can be better solved on the barren dune lands and the plains.

In Italy the extent of the plain land is limited and hence it follows that re-afforestation must mainly be carried out on the mountain areas, using for the purpose lands that have either gone out of cultivation or are unsuitable for agriculture. It is probable that the tendency to abandon lands will become more strongly marked, and special attention must be paid to the fresh surfaces that thus become available in order to encourage private enterprise in re-afforestation work. The gradual abandonment of farm crops and their replacement by forest plantations, which has been tried in certain parts of the southern Apennines, have been carried out with encouraging results.

Both from the technical and practical points of view this system appears well suited to the purpose. Simultaneously with efforts to intensify work of hydraulic regulation on lands most suitable for mountain agriculture, it is possible to allow and even to encourage, a continuance of cropping on the lands in which it is desired to establish forests. Under a dry climate forest plantations are greatly advantaged by superficial ploughings and the agricultural profits, even though on a constantly decreasing scale, assist in bring about a change-over to the new policy of mountain agriculture.

At the same time, in connection with new re-afforestation schemes, advantage must be taken of small wooded areas, forming an essential part of medium cultivation units such as are now in favour in mountain areas in preference to the indefinite parcelling of estate.

In view of the diversity of the requirements of the situation, the State should possess a direct and complete knowledge of the special conditions of the mountain areas in the various parts of the national territory.

Hence the provincial technical committees, to which reference has already been made, have been set up; their membership includes the chiefs of the local forestry, engineering and agricultural services.

The Forestry Militia contributes its special competence in the matter of mountain improvement work to the service of these committees, together with all its special knowledge of the localities and the particular attitude of the populations.

The Militia, in consequence of its official responsibilities and distribution throughout all parts of the mountain area, is kept in constant touch with all local activities. Its officers have already had practical experience of the limited results which have been brought about as a result of intermittent and partial efforts ill co-ordinated with the true life of the district.

In the years 1928, 29 and 30 the Forestry Militia carried out the following work :—

I. — *Work of general superintendence.*

- (1) The enforcement of restrictions on the unlimited utilisation of mountain lands in 250 communes, representing an area of 696,000 hectares:

- (a) Control of clearance work on mountain land in 11,000 cases, representing an area of 22,000 hectares.
 - (3) The limitation as circumstances require of the undue exploitation of forests (18,000 ha.).
 - (4) The regulation of pasturing over the whole area (13,000 cases).
 - (5) Notification to the police of 242,000 cases of infringement of regulations or of improper usage.
 - (6) Direct action in connection with forest fire control (about 4,000 cases).
 - (7) Preparation of the forestry survey for 12 provinces.
 - (8) Preparation of working schemes of private fellings (30,000 cases).
- II. — *Forest Improvement and Development.*
- (1) Reforestation by local provincial associations for an area of 4,500 hectares at a cost of 9 million liras.
 - (2) Regeneration of impoverished forests for an area of about 2,400 hectares at a cost of 3.6 million liras.
 - (3) Assistance after preliminary local inspection, in 835 cases of voluntary re-afforestation schemes covering 38,404 hectares. Distribution of 37.8 million nursery plants for re-afforestation purposes as also of 27,000 kg. of seeds.
 - (4) Assistance to the special sections of mountain agriculture and pasturing. Appointment of special bodies for the proper management of communal forests.
 - (5) Forestry propaganda. Lectures. Soldiers' courses and courses in educational institutions. Distribution of 38,000 bags of forest seeds to tourists through the good offices of the Touring Club. Attendance at congresses, meetings, etc.
- III. — *Special economic protection of communal timber resources.*
- (1) Preparation of management schemes in 18,000 cases, covering forestry products to a value of 131 million liras.
 - (2) Preparation of general schemes for the improvement of communal forests in 1174 cases and for a total area of 5,000 hectares. For this special purpose a sum of 6.9 million liras has been set aside from the profits on fellings.
- IV. — *Regulation of the upper watersheds of rivers which have fallen into neglect.* — Preparation of 231 schemes dealing with the restoration of 68,000 hectares, including reforestation plans for 50,000 hectares. For these schemes there is a total estimate of expenditure amounting to 225 millions liras. During the period 1928-1930 the schemes have been completed for about 7,000 hectares at a cost of 37 million liras.
- V. — *Improvement of pastures.* — Preparation of 372 schemes at a cost of 27 million liras. Up to the present State contributions for these schemes amount to about 8 million liras.

The corps of civil engineers specialised in hydraulic management assist the technical committee with their experience gained from work already carried out in the valleys and the lower sections of the river courses. At the same time, through the committees they have better opportunities of acting with due relation to the restoration works carried out in the upper watersheds and can help to round off and complete any special proposals for the hydraulic regulation of a mountain area from the point of agricultural development.

Similarly, through the technical committees the various groups of engineers have better possibilities of co-ordinating their work of providing communications in mountain districts.

The Directors of the Travelling Chairs of Agriculture (*Cattedre ambulanti di Agricoltura*), which now possess, to an increasing degree, sections specially devoted to mountain agriculture and to the development of pastures, are able to give the committees valuable expert advice on the difficult question of making changes in the crops cultivated so as to establish them definitely in the most suitable areas and particularly where the necessary changes in the distribution of lands are possible economically.

All the members of these committees also take part in the work of the Provincial Economic Councils, wherein there is frequent opportunity for an exchange of views with the representatives of local interests and the leading members of the Corporative bodies.

Finally, the frequent opportunities of contact, with the Central Department in charge of all land improvement work is highly beneficial as making sufficiently simple and elastic the general controlling policy.

These solutions, whether directly proposed by individuals or recommended to the landowners by the technical organisations of the State, and always adapted to the various special requirements in each case, should, before being approved by the State and receiving its assistance, be duly recognised as suitable for increasing agricultural production with due regard to economic considerations.

Thus, by laying down the doctrine of State intervention for the assistance of a continuous work implying adaptation to particular sets of conditions, collaboration of the local inhabitants is brought in as an indispensable factor, and without this even the wisest of doctrines are bound to be of little practical value.

S. CABIANCA.

Notices.

INTERNATIONAL CONGRESS ON TIMBER AND FORESTRY QUESTIONS. — An International Congress for the discussion of questions relating to Timber and Forestry will be held at Paris from 1 to 4 July 1931 in connection with the Colonial Exhibition.

The Congress is being organised by the Touring-Club of France with the assistance of the Department of Waters and Forests, the Department of Technical Instruction, the National Committee for Colonial Timbers, the Institute of Agricultural Research and the Timber Group of the General Confederation of French Production.

The Congress will be followed by an interesting study journey through the French Alps, giving members the opportunity of obtaining first hand knowledge of the importance of reforestation work and of the valuable results already obtained in France.

This journey will last from 6 to 13 July, starting from Paris and terminating at Nice. Applications for membership should be sent to the Touring-Club de France, 65, Avenue de la Grande Armée, Paris (16).

The full programme of the Conference will be published shortly.

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MONTHLY BULLETIN

OF

AGRICULTURAL SCIENCE AND PRACTICE

GENERAL AGRONOMY

The Apple Harvest in the United States.

Apple growing is one of the most important of the North American fruit industries. The total annual production of the United States is 200 million bushels and the commercial production, that is the production for the market, is 99 million bushels, corresponding to 33 million barrels.

About 16 % of this production is exported to Europe, Central America, South America and, in lesser amounts, to Africa and to the East. Apple imports into the States come almost exclusively from Canada and amount only to 25,000 barrels.

The crop is consumed fresh or dried or preserved and is used also for the manufacture of various products such as cider, vinegar, jams, jellies, apple pectin, etc. Apples for shipping to various markets for fresh consumption are stored all the year round in large cold stores.

The number of co-operative societies for the handling and marketing of apples is higher than that of the similar societies concerned with the citrus industry. The commercial success of this as of other agricultural products depends on the adoption of systems which allow of the development of co-operation in all operations between the producer and the consumer.

The progress of apple growing in the United States of recent years is largely due to better quality fruit, to standardisation of the grading and packing systems and to better preparation of the fruit for market.

In the opinion of Department of Agriculture experts the apple industry has prospects of still greater development provided that the costs of machines, of packing, transport, etc. tend to become lower and that efforts are made to reduce to a minimum the handling of the fruit. Moreover the ever-increasing demand for apples, the improvement of varieties, the better condition of the fruit, the greater uniformity in packing and the better distribution of the fruit to the various consuming centres have contributed very considerably to the development of apple growing.

The production per tree or per acre depends on a number of factors :— variety and age of the tree, number of trees per acre, local cultivation methods. In New York State the average commercial production varies between 200 and 250 bushels per acre, in the Western States between 175 and 250 bushels, in California between 500 and 600 boxes per acre (a box contains from 45 to 50 lbs.).

In 1929 the commercial apple orchards in the United States comprised about 85,500,000 trees distributed as shown in Table I.

TABLE I. — *Distribution and Production of Apple Orchards in the United States.*

State	Number of apples	Average commercial production 1924-1928 in bushels	State	Number of apples	Average commercial production 1924-1928 in bushels
New York	9 142 000	14 200 000	Maryland	1 400 000	1 200 000
Virginia	7 245 000	7 100 000	Indiana	1 355 000	615 000
Washington	6 800 000	25 000 000	Tennessee	1 350 000	400 000
Pennsylvania	4 700 000	3 422 005	Idaho	1 337 000	4 003 000
California	4 500 000	5 150 000	Colorado	1 114 000	2 568 000
West Virginia	4 450 000	3 630 000	Kansas	1 100 000	1 005 000
Michigan	4 410 000	4 274 040	Georgia	950 000	385 000
Illinois	4 075 000	3 490 000	Delaware	895 000	1 195 000
Ohio	3 500 000	2 371 000	Wisconsin	875 000	302 000
Missouri	3 100 000	1 798 000	Iowa	862 000	434 000
Arkansas	3 050 000	1 612 000	Oklahoma	855 000	358 000
North Carolina	2 085 000	602 000	Connecticut	700 000	682 000
Maine	2 030 000	1 615 000	New Hampshire	650 000	698 000
Oregon	2 000 000	4 365 000	Montana	525 000	340 000
New Jersey	1 800 000	1 940 000	Minnesota	515 000	335 000
Massachusetts	1 735 000	2 050 000	New Mexico	510 000	225 000
Kentucky	1 700 000	400 000	Utah	500 000	585 000

In the other States (Nebraska, Alabama, South Carolina, etc.) there are less than 500,000 apple trees.

According to the Department of Agriculture census figures in 33 States (which supply 99 % of the total production), 30 % of the trees are up to 9 years old, 65 % less than 19 years and 15 % over 19 years. A considerable number of trees have not yet come into bearing.

Numbers of new orchards have been established in the most favourable apple growing districts and growing selected varieties will have a good influence on future production.

According to an enquiry carried out by the Bureau of Agricultural Economics in 4 regions the varieties Delicious, MacIntosh, Jonathan, Stayman, Winesap and Yellow Transparent occupy 43 % of the total orchard acreage. Their cultivation has been greatly extended of recent years. The varieties Baldwin, Rome Beauty, Rhode Island Greening, Ben Davis and York occupy 27 %. The Ben Davis variety which was much grown in the past is to-day practically abandoned. The principal summer or early varieties are:— Yellow Transparent, Gravenstein, Wealthy, Oldenburg, Beboni, William, Starr and Maiden Blush. The winter or late varieties are:— Baldwin, Rhode Island Greening, Delicious, MacIntosh, Stayman, Winesap, Tompkins King, Jonathan, Wagner, Ben Davis, Fameuse, Rome Beauty, Grimes, York Imperial and King David.

Harvesting. — Harvesting the crop is clearly one of the most important operations of the industry. The varied varietal characteristics, climate, cultivation methods and several other factors influence the stage of maturity at which the fruit is gathered and make it difficult to fix rules for its determination. Various qualities, principally the colour of the skin, the colour of the pips, the readiness with which the fruit comes away from the stalk, etc. may together with practical experience serve as indications of the condition of the fruit. Size varies according to the variety and the season. Market prices vary according to the stage of ripeness. The typical red coloration is of great importance from an economic standpoint.

For determining the state of ripeness of the fruit the use of a "pressure tester" has become general. The tester is a graduated metal bar a foot long and $\frac{1}{2}$ inch in diameter, with at one end a spring attached to a movable piston. The piston

is connected by a wire to a small electric bulb on the bar. The appliance measures in pounds the pressure required to introduce the piston a given distance into the fruit. The pressure lights the lamp and the degree can be read on the graduated scale. This operation is repeated several times on the same fruit and on about 20 apples of the same variety grown in different parts of the plantation and thus gives the average degree of ripeness of the fruit.

Certain fruitgrowers harvest at three different times, but this practice is recommended only for the superior quality fruit.

The bags used for gathering have capacities of $\frac{3}{4}$, 1 and $1\frac{1}{2}$ bushels. The ladders used are of the simple type with a crosspiece at the top and 18 to 30 feet in height. In 90 % of the orchards controlled by the Bureau of Markets the workmen are paid by the day and in the remaining 10 % by the amount of apples picked. It is reckoned that one man can, if the trees are not too high, pick from 100 to 150 bushels a day, and with tall trees 60 to 75 bushels. Pay varying according to the quantity picked makes for quick work but for this very reason is an advantage only in the case of medium quality fruit, for the work may lack the care in handling which is essential for the keeping quality of high grade fruit. The fruit is carried from the orchard to the packing shed in boxes, hampers or barrels according to local custom. Three-bushel barrels are most commonly used in the States of New York and New England. Hampers usually have a capacity of one bushel.

In districts in which it is necessary for the control of orchard diseases and pests to use arsenic or to spray when the season is well advanced a considerable residue is left on the apples, which caused heavy losses to American growers in 1925 and 1926. In 1925 the British Government made a regulation by which apples coming from America might not contain on their entry into the United Kingdom more than 0.01 gm. of arsenic per pound, and several growers who were unable to declare the arsenic content of exported fruit had their shipments refused at the Customs Office. Certain varieties, moreover, are readily spoilt by the prolonged washing necessary to remove the layer of arsenical compounds.

Since 1926 machines for washing the fruit have been improved and Professor HARTMAN's method of using a 0.5 to 1 % solution of dilute hydrochloric acid has appreciably improved the situation. This method has now been standardised for apples and pears and during the last few years more than $\frac{1}{3}$ of the fruit crop of the Pacific Northwest has been treated in this way.

Packing Firms and Co-operative Societies. — According to figures supplied by the Bureau of Agricultural Economics the number of cooperative societies and growers' associations increased by 40 % between 1915 and 1925. In 1927 the co-operative movement in the United States was supported by over 2 million agriculturists and its transactions reached a sum of 2,300,000,000 dollars. To-day there are 12,000 co-operative societies. Experience shows that for a co-operative system to work satisfactorily it should be able to count on a minimum of 8 or 10 thousand barrels of fruits.

Packer firms have increased in number of late years and are now found in all the fruit growing districts. They offer the following advantages:— (1) they facilitate standardisation of the produce — (2) all packing and storage operations can be carried out in good conditions and at any moment — (3) they encourage the use of machines and other aids to economic working — (4) work carried out entirely in one place is obviously simplified and more economical.

In the packing of fruit it is necessary first to determine the type of package to use, then the grades, which depend on the varieties grown, market preferences, etc. The fruit must be adequately uniform in size and colour. The standard packages

for apples are the barrel, the box and the hamper. The standard barrel is of the following dimensions : — total length, 28.5 inches ; interior length, 26 inches ; diameter of the bottom, $17\frac{1}{8}$ inches ; maximum circumference, 64 inches ; capacity, 7056 cubic inches. It contains 3 bushels and a number of apples varying according to size :— 350 of $3\frac{1}{4}$ inches in diameter — 450 of $2\frac{1}{4}$ inches — 550 of $2\frac{1}{2}$ inches. A barrel contains 225 to 250 apples of the Wolf River or Tompkins varieties. There are two types of barrel differing in the quality of wood and care with which they are finished off.

A standard box has the following interior measurements :— $10.5 \times 11.5 \times 18$ inches ; its content is 2,173 cubic inches. For very large fruit a special box measuring $10 \times 11 \times 20$ inches is used.

TABLE II. — *Types of Package.*

Diameter of fruits in inches	Number of fruits in a box	Number of layers of fruits	Number of fruits per layer
$3\frac{3}{4}$	64	4	4 layers of 16 fruits each.
$3\frac{1}{2}$	72	4	4 " " 18 " "
$3\frac{1}{4}$	80	4	4 " " 20 " "
$3\frac{1}{4}$	88	4	4 " " 22 " "
$3\frac{1}{4}$	88 (for flat apples)	5	layers 1-3-5 of 18 fruits — layers 2-4 of 17 fruits.
$3\frac{1}{4}$	100 (for elongated apples)	5	5 layers of 20 fruits each.
$2\frac{11}{16}$	118	5	layers 1-3-5 of 23 fruits — layers 2-4 of 22 fruits.
$2\frac{10}{16}$	125	5	5 layers of 25 fruits each.
$2\frac{9}{16}$	138	5	layers 1-3-5 of 28 fruits — layers 2-4 of 27 fruits.
$2\frac{7}{16}$	150	5	5 layers of 30 fruits each.
$2\frac{1}{2}$	163	5	layers 1-3-5 of 33 fruits — layers 2-4 of 32 fruits.
$2\frac{1}{4}$	175 (only for flat apples)	5	5 layers of 35 fruits each.

TABLE III. — *Dimensions of paper lining boxes.*

Number of fruits in a box	Size of paper
64 to 80	11 x 11 inches
88 " 113	10 x 10 "
125 " 180	9 x 9 "
For smaller apples	8 x 8 "
For larger apples	12 x 12 "
	14 x 14 "

Packages must bear on the outside particulars of the country of origin, the grade and variety of fruit, the size and weight of fruit, the name of the grower or consigner — as, for example :—

Apples from Virginia, " U. S. Fancy ", " Delicious ", 80, 3 inches. Min.

Net weight

Juan Rodriguez, Winchester Va.

TABLE IV. — *Average cost (in cents) of handling operations.*

Picking and transport to packing sheds per bushel	Packing	Loading on car	Total cost per bushel	Total cost per barrel
10	6	2	18	54

Fruits are stored during the whole year in cold stores annexed or not to the premises of the co-operative society. The capacity of the stores may be from 40,000 to 350,000 barrels.

Ventilation, moisture and temperature are the most important factors in the cold chambers and of these the first has most influence on the keeping quality of the fruit. With a uniform temperature of -1.1 to $+4.4^{\circ}\text{C}$ and good ventilation apples may be kept for long periods. The rate for storage in the cold chambers is 10 cents per month per barrel or 50 cents for the whole season (8 months). For boxes and hampers the rate is 20 cents for the whole season.

The cars for transport of fruit must be very clean. Packages must be loaded with care and all parts of the car must be well ventilated. A car contains from 160 to 200 barrels or 350 to 576 hampers. In certain of the fruit growing districts special cars are used which carry 175 barrels or 756 boxes. The cars always contain 4 layers of boxes, barrels or hampers. Refrigerator cars are regarded as indispensable in summer and winter to protect the fruit from sudden changes of temperature. Over 160,000 are now in use.

The apple trade is in the hands of over 4000 sales agents who distribute the fruit to the different markets. The apple-drying industry which reached its zenith a few years ago is now losing its importance. The preserving industry on the other hand is steadily increasing, as shown by the following figures:— in 1929 about 600,000 bushels of apples were dried with a value of about 2 million dollars and 3,500,000 cans of apples were prepared with a value of over 8 million dollars. The value of apple cider and vinegar also is calculated at about 25 million dollars.

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ANGEL, PASCUAL.

TROPICAL AND SUBTROPICAL AGRICULTURE

Factors influencing Root Development in Rice and some Consequences.

It has been already recognised as a most important factor in the development of plants, that growth of roots should not be hindered by any obstacles or by any adverse condition. Experience has taught the farmer that the yield of crops depends in a large measure on the development of the roots.

Agricultural practice therefore has always sought for means to remove obstacles which the roots might encounter in the soil and to provide the best conditions for their development. We may assume that this happened not only in Europe, but also in the Asiatic countries, where rice growing is the most important industry, but which requires soil conditions totally different from those to which the European farmer is accustomed.

It has been thought that rice could develop different types of roots, according to conditions: those grown in a dry soil comparable to our common grain roots, and those grown in a muddy soil comparable to the roots of swamp plants. A careful examination of paddy roots of different types has shown, however, that they do not resemble those of typical aquatic plants, but are similar to those of ordinary dry land crops.

Root development of dry land plants has been promoted in agricultural practice by different means: by removing physical obstacles (such as hardpans), by improving aeration by tilling operations, by drainage, and by manuring. The choice of devices to obtain favourable conditions depends largely on the character of the soil and topographical limitations. Aeration of soil is usually most pronounced in soils of a sandy character and least in heavy clays and loams. Drainage is usually required more urgently in the last. By manuring with organic material soil structure is improved, so that penetration of roots is promoted. After the farmer became accustomed to the use of artificial fertilisers, it was found that different chemical substances have a different influence, phosphoric acid having a stimulating influence on root development.

It is known that root development in relation to that of the stems and leaves is more pronounced in poor than in rich soils and that the same is true when soils of different grades of humidity are compared, the drier soils forcing the plant to develop a larger root system.

That rice as a dry land crop does not differ in these respects from other grain-plants has recently been proved by SETHI (1). He planted rice in pots in different soils, under different manurial treatment and determined at different intervals the quantities of dry material of root and shoot. In this experiment two different groups of varieties were represented: early and late maturing ones. By fixing the root ratio of the unmanured plants grown on loam soil at 100, the results of the experiments on the influence of manuring may be summarised as follows:—

Days after sowing	No manure	Stable manure		Amm. sulph.		Superphosph.		Muriate of potash,	
		Early	Late	Early	Late	Early	Late	Early	Late
15	100	68	150	85	73	128	130	150	217
30	100	158	70	61	19	70	116	166	70
45	100	100	110	59	49	143	205	132	213
72	100	81	108	75	50	125	270	94	180
99	100	—	50	—	37	—	55	—	81

There was a very large difference in the production of dry material between the pots that did not receive manure and the others, indicating that the loam used in this experiment was very poor. It may be questioned therefore if the experi-

(1) R. I. SETHI. Root development in rice under different conditions of growth. *Memoirs of the Department of Agriculture in India. Bot. Series*, 1930, Vol. XVIII, No. 2.

ment should not have given other results when richer loam had been used or when the action of different manuring had been deducted by comparing complete manuring with different combinations, omitting the principle whose action was to be determined. The results, however, confirm those already obtained with other grains, viz., that phosphoric acid stimulates root production and that nitrogenous manure favours development of shoot.

Another set of pot experiments was concerned with the influence of different soil types. Some pots were filled with gravel, others with sand, loam or clay, and two other sets with clay and sand in such a way that the upper layer of one set consisted of clay with a subsoil of sand, and the other of sand with a subsoil of clay. No manure was given.

After a short time, however, the plants growing in gravel and sand died, apparently for lack of manure. The production of dry material on clay and loam showed large differences. It may therefore be questioned if the differences found by this experiment are due to the differences of the types of soil as such, or to differences in content of manuring principles, the clay being a very rich soil the other soils being poor or very poor. It seems therefore, that these experiments do not allow of any conclusion on the influence of soil type. Only when differences in richness are excluded can the action of differences in physical character be deduced from the results.

The question of root development of rice under aquatic conditions, the most important question in relation to ricegrowing, is, however, quite different from that of root development of grain plants grown under dry land conditions.

IRRIGATED RICE-GROWING AND AERATION OF SOIL.

As the roots of rice grown under aquatic conditions do not resemble those of aquatic plants, but are similar to those of ordinary dry land crops, they require oxygen to be healthy and strong. This oxygen can be brought to them only as a solution in the water that surrounds the roots.

If the oxygen dissolved in the surface water is to aerate the roots drainage would seem to be an important factor. If the soil is badly drained the oxygenated water cannot enter the soil and consequently aeration would be restricted to the surface layers; and on the other hand, in well drained soils, the aerated water would penetrate deeper, allowing the rice plant to develop a larger root system and therefore a proportionally higher crop. If this is the case aeration can be promoted by a thorough periodical draining of the soil.

There are however several agricultural practices that do not conform to this theory.

In many of the rice growing countries a hardpan is formed by the action of the irrigation water only a little below the surface and farmers take much care not to break this hardpan. Even more remarkable is the fact, that in new ricefields where such a hardpan is not found, puddling is a universal practice, by which a more or less impervious layer is artificially formed. Sometimes this is done by men, but in several places it is done by driving cattle for a considerable time over the irrigated plots. It may be, that the purpose of this practice is to prevent the loss of irrigation water by drainage, in this way making it possible to irrigate a larger acreage with a given quantity of water. But the practice is also found where it cannot be explained thus. It will be seen later that another explanation has been found, that throws fresh light on this question.

With regard to the question of periodical drainage, in some parts of the rice-

growing countries it has been practised generally and in others it is not known and experiments have given contradictory results. In Sumatra, for instance, it is a common practice, in Java not.

KHOI (1) gives some valuable information in regard to the practice of rice-growing in the Van-Trai region of Indo-China. Irrigation water is given from the start, to allow the forming of a thin mud by repeated ploughing and harrowing. Water is covering the field during transplanting, till the tillering process has ended, when the water is allowed to flow off. As soon as flowering commences water is given again till the time of fruit setting. This practice is the same as in the larger part of Sumatra, but in Java water is given from planting till a short time before harvest, and this method is followed in many other countries.

We may ask whether the application of one method or another depends on the kind of soil or whether different varieties also require different treatment.

That soils influence the practices in rice growing is without question. KHOI in the article cited gives also a description of ricegrowing on fields formed by marine sands in the same region. Here the soil is not worked into a mud but ploughed and harrowed in a dry state and rice is transplanted without irrigation. No water is given till the plants have reached the stage at which the soil is no longer visible. In the time before irrigation starts, several hoeings are given. At this stage of development hoeing is regarded as more valuable than irrigation. This is quite right, for such sandy soil becomes very compact under water, in this way preventing aeration and root development.

Under aquatic conditions certain sand soils provide bad aeration, and some heavy clays, that easily form a thick layer of thin mud, facilitate it, in this way reversing the aeration conditions of the same soil types in dry conditions.

It would be unwise, however, to generalise. For several sandy soils give perfect aeration when irrigated and several heavy clays offer very poor aeration. An example of the first may be found in the residency of Tapanuli in Sumatra and of the last in the residency of Demak in Java.

In the Netherlands Indies rice varieties are divided into two main groups, according to morphological and physiological characters. One group does not respond favourably to periodical drainage, of the other group many varieties require it to give a maximum yield.

Summarising we may say, that agricultural practice, developed by centuries of experience, has developed features which seem to be contradictory to the aeration of soil, such as puddling and uninterrupted irrigation, though we may assume, that where this is practised, root development is promoted.

USE OF FERTILISERS.

VISWANATH (2) in a short but very suggestive article gives the results of valuable investigations in ricegrowing in the Madras part of India.

The general results of manuring experiments have been that nitrogenous and phosphatic manures are in general need and are responded to by the crop when applied singly or together, but their effect when combined is better.

Phosphatic manures have been found to stimulate the assimilation of nitrogen which would otherwise not be utilised.

(1) T. T. KHOI. Quelques principes d'irrigation dans la riziculture annamite. *Bulletin économique de l'Indochine*. Vol. 33, Octobre 1930, B., p. 747.

(2) B. VISWANATH. The Story of two Decades of Chemical Research on Paddy Soils in the Madras Presidency. *The Madras Agricultural Journal* 1930, Vol. XVII, No. 11.

It has been shown that artificial manures are not as efficient as green manures for paddy and that the efficiency of either class of manures can be considerably improved by combining them. This raises the question as to the proportion in which artificials and green manures should be used. Large dressings of green manure appear to render supplements of artificial nitrogen, like sulphate of ammonia, ineffective.

The results of a large number of experiments in the field and in pot cultures spread over a number of years have shown that all the natural and artificial nitrogenous manures are more or less beneficial to paddy *but that they are more economical when applied in conjunction with bulky organic manures.*

PROBLEMS OF GREEN MANURING.

Results of green manuring-experiments on paddy fields have been of the most contradictory character, in many cases they have been satisfactory, but many too have given negative results.

Since green manure undergoes putrefactive fermentation under water, it was considered that an examination of the soil gases would open up the problem. On this examination VISWANATH gives much information.

The first examination showed that the normal fermentation of green manure in swamp paddy soils leads to the production of different gases and that the introduction of a crop into that field modifies the proportion in which some of the gases are produced and inhibits the production of others. The soil conditions are found to be anaerobic in character and therefore nitrification is impossible and nitrates produced during the period when the soil was dry are quickly denitrified. Under these conditions, therefore, the nitrogen required by the crop is obtained in the form of ammonia and probably from other nitrogenous organic compounds produced by the anaerobic decomposition of the proteins in the green manure.

This gives a very important practical indication : that growing a green manure crop in a field to which it has to be subsequently applied as a green manure in a dry condition is not advantageous, as the nitrogen is largely dissipated as gas. This is especially true when a non-leguminous plant is used for green manuring, for, as this crop has taken its nitrogen originally from the soil, it involves a distinct loss of nitrogen.

Certain substances formed as a result of this decomposition are toxic to the rice crop and should be removed in the drainage water or should be destroyed by prolonged decomposition before seedlings are transplanted.

This result is in correspondance with agricultural practice. Oriental farmers know, that the best method of preparing a paddy field when submerged and covered by a more or less dense vegetation is, to give it a rest after the first ploughing before the finishing operation is started. The duration of this rest differs considerably. In Sumatra, where spontaneous vegetation on the ricefield is mostly very luxuriant, a period of at least three weeks is considered the best. But when a paddyfield not covered by vegetation has to be prepared, this period of rest is not considered necessary.

A more detailed study of the soil gases revealed the fact that the gases escaping through and at the surface of the water in the paddy fields are different from those that are present in the soil and consist mostly of oxygen and nitrogen as against methane, hydrogen and carbon dioxide that are formed in the soil. A certain relationship was also noticed between the evolution of oxygen and the presence or absence of a rice crop, and pot experiments have clearly shown that the effect of this crop

is to diminish the evolution of oxygen. The supposition is, therefore, correct that the oxygen is used for aeration of the roots.

The evolution of oxygen has been traced to a film of algae commonly seen on the soil surface of paddy fields and this film is found to contain bacteria which oxidise hydrogen and methane with production of carbon dioxide. The carbon of this gas is utilised by the algae for food, liberating oxygen which dissolves in the soil water and aerates the roots.

It appears reasonable to presume that the better the drainage, the deeper would be the aeration and therefore the better the development of roots and the results of cropping. But actual experiments have shown that this is not the case. The mere draining of the soil is inadequate for this purpose. The simple system of slow movement of water through the soil and therefore through the root range has been found to be most beneficial for the crop. The reason for this has been found to be that the water percolating through the soil is strongly charged with oxygen and therefore supplies it to the roots ; whereas the simple admission of air into the soil by thorough draining would yield only a weak solution of oxygen. The best results are obtained with a moderate amount of drainage and too slow or too rapid drainage would result in decreased yield.

The reason for this has been traced to the fact that the development of the film which is responsible for the supply of oxygen occurs best under moderate drainage conditions. Thus the most efficient drainage in paddy fields is not the quickest but one that permits the surface film to maintain its full activity.

The practical aspect of these investigations from the point of view of the farmer is that the relationship of green manure to the aeration of roots is of the greatest importance and that, apart from all other considerations of manurial value or influence on the texture of the soil, *one of the most important functions of green manuring with reference to paddy soils lies in promoting the activity of the surface film, which is responsible for the proper aeration of the roots.*

It is in this way that an explanation may be found of the influence of bulky organic manures on the results of manuring with artificial fertilisers. The first by their biological influence promote the development of the root-system and this enables the plant to make use of the non-organic food offered by the second.

It is however of interest to note that agricultural practice in several cases is in accordance with these findings. The practice of puddling, questionable before this discovery of the algal flora and its biology, fits remarkably well in this system ; it would be very doubtful if it is possible to develop a better device to retard drainage on hillside terraces.

Another practice often to be seen in sparsely populated regions with plenty of water is to restore the small dykes surrounding the fields after harvest, to cut down the remaining straw and submerge the fields. It has been thought that by this practice soil conditions would be harmed by lack of aeration, but it now seems to be in accordance with science. In other places, heaps of coarse organic material are put on the field after harvest, which is submerged again, and small fish are brought in, which feed on the algae that develop on the heaps and in the bottom. This practice has often been rejected on account of its supposed bad influence on soil conditions, but this now seems unwarranted and, indeed crop results already have justified the practice.

Some observations made in Java are in accordance with this theory. In the eastern parts of this island a very large acreage is devoted to fishponds. By accident it was found that molasses of sugarcane had a very beneficial influence on the development of blue algae on which the fish feed, and thereby on the fish

crop. It also has been found in Java that molasses used as a fertiliser on paddy fields gave very good results on heavy clays and light sands, both usually giving poor crops. The explanation given was not very satisfactory but combining the influence of molasses on the rice crop and its influence on the development of algae in the fish ponds, it seems, that the first action may be explained by the promoting of algal flora on the ricefield surface and better aeration of the roots of the paddy, molasses taking here the place of bulky organic matter.

NGUYỄN-CONG-TIẾNG (1) in an article on the remarkable practice of using an azolla propagated between the young rice as a green manure, remarks that after the death of the azolla and its decomposition the colour of rice improves very much, turning from a yellowish green to a dark green. This change in colour he attributes to the nitrogen becoming available for the rice by the decomposing of the azolla. It seems, however, that it also may be attributed to a better aeration of the soil, as a bad aeration also causes the leaves of the rice to turn yellow.

Several questions arise as a sequel to these investigations and the theory built on them. One of the most important is whether the development of the algal film is influenced by temperature and light. If temperature is of importance what occurs in those countries where the planting time of rice does not coincide with high temperature and what is the consequence in regard to soil aeration, drainage and green-manuring or the application of large quantities of stable manure? The practices in Italy and Japan where large quantities of bulky organic manures are applied to the rice fields seem to indicate that the lower temperature does not prevent the formation of the film. If light has an important influence it may be expected that the algae play an important part in the development of the root only so long as the crop does not yet cover the field. During that time the growth of the roots is most pronounced. May drainage be beneficial after that time?

Has soil itself anything to do with the formation of the algal film?

It is clear, that numerous other questions of practical importance may be raised, and research on rice growing may be stimulated and led into new paths.

LIGHT AND ROOT DEVELOPMENT.

It is sufficiently established, that rice is an intense light loving plant. In an experiment made by ESPINO and PANTALEON (2) the importance was established of the intensity of sunlight in the production of dry matter in the rice plant. Great differences exist between development under full daylight conditions and under diffuse light conditions, as may be shown by the following results.

Light condition	shoot cm.	Length of root cm.	Weight of dry matter			Ratio	shoot root	dry matter
—			shoot gr.	root gr.	Total gr.			
Full direct . . .	67.0 = 100	30.4 = 45.4	7.38	1.87	9.25	100 : 25.3		
Diffuse	57.3 = 100	22.2 = 39.0	2.49	0.79	3.28	100 : 31.7		
Early morning .	51.8 = 100	12.8 = 25.0	2.67	0.53	3.20	100 : 20.0		
Early afternoon.	32.3 = 100	10.5 = 32.5	0.56	0.17	0.73	100 : 30.3		

(1) NGUYỄN-CONG-TIẾNG. L'azolle cultivé comme engrais vert. *Bulletin Economique de l'Indochine* 1930, p. 335.

(2) R. B. ESPINO and F. PANTALEON. Influence of light upon growth and development of plants, with special reference to the comparative effects of morning light and afternoon light. *The Philippine Agriculturist*, 1931, Vol. XIX, No. 9, pp. 563-579.

These figures relate to the average of one plant, grown during 15 days under normal conditions and under different exposures for the following 30 days, harvested when 45 days old.

It seems that there is a large difference in the influence of morning and afternoon exposure. Morning exposure and diffuse light give about equal results, except in the ratio between root and shoot development.

What causes this apparently more beneficial influence of the morning light, or rather the harmful effects of the afternoon light, is now a pertinent question.

It is common knowledge that the temperature in the tropics is higher in the afternoon than in the morning. Might it not be that the higher temperature is the principal cause of the harm, although other causes may exist? Several investigators, as COPELAND and others have already established the fact that plants transpire more rapidly during the first hour or during the first two or three after midday than at any other time of the day. Therefore, it appears, that the harmful effects of the afternoon exposure were due to excessive transpiration. This in turn is facilitated or accelerated by the excessive heat usually experienced in the afternoon. Absence of water could not be the cause as the cultures were always sufficiently supplied.

The plants showed the following features :

1. Full direct light. Plants healthy, with broad dark green leaves. Heavy tillers.
2. Diffuse light. Plants slender, with long narrow light green leaves. Few tillers produced.
3. Morning light. Similar to plants in culture 2.
4. Afternoon light. Plants rather weak and stunted in growth. Leaves chlorotic, short, narrow and thin.

Let us now turn our attention to the harmful effects on plants of excessive transpiration. It is known that when the loss of water by transpiration through the leaves is not replaced, the leaf cells lose turgescence. This loss of turgidity, in turn, closes the stomatal pores and may produce a drooping or flagging position of the leaves. Evidently, this was the case, as during afternoon exposure the plants appeared drowsy. From general knowledge of plant behaviour it may be supposed that the lack of growth and development of the plants during afternoon hours was due to lack of turgor of the leaf cells. Turgor is essential, at least for the initial growth of the leaves. Moreover, the closing of the stomata and the drooping position of the leaves are two conditions well known as interfering with photosynthetic activity of plants. It is, therefore, within reason to suppose that the manufacture of food slackens in the afternoon, hence, the poor growth.

From the figures reproduced above it seems that the plant under unfavourable light conditions tries to restore equilibrium by developing more energy in root formation. The shoot-root ratio for the dry matter weight might give indications in this direction. The authors however, state that the figures given for the weight of dry matter are not reliable and that therefore those relating to length of shoot and $\frac{\text{shoot}}{\text{root}}$ are of much more value. From this it is seen, that the ratio of plants exposed to full light conditions is highest. When we take into consideration the fact that the leaf surface is proportionally larger than that of the other parts of the plant we may assume that unfavourable light conditions upset the equilibrium between root and shoot development, exposing the plant to the results of excessive evaporation and diminished photosynthetic activity.

ROOT DISEASES.

In all rice cultivating countries the rice crop is often damaged by diseases of the roots, which are known under different names. They may be caused by different factors, *e. g.*, acidity, insufficient aeration of the soil, reduction processes, etc.

VANDER ELST studying this question in Java found a certain relation between more or less severe outbreaks of such disease and climatological factors, at least in some parts of the country, where large acreages are often damaged.

As a result of his investigations, which have not yet been published, he has already made recommendations to the agricultural extension service of the island, which has made several experiments in accordance with his advice.

VANDER ELST found, that as a general rule a wet season following on a dry season which had, however, more than its normal rainfall, is certain to show a large outbreak of the disease.

The largest acreage of rice is planted at the beginning of the wet season, at which time the number of sunshine hours is very low. He found too that under such conditions root development was inferior to that under good light conditions. When, however, light conditions improved gradually outbreaks of the disease are not so severe as when the dark days of the rainy season are interrupted by a period of full bright sunshine.

VANDER ELST concluded that the outbreak of this disease, at least in part, is due to a disequilibrium between the development of shoot and root.

To prevent this outbreak he therefore recommended the use of all means that may be useful to promote development of roots. He therefore recommended in the first place the use of phosphoric acid as a fertiliser, especially in the nurseries. The seedlings after transplanting show a much larger development of their root system than when grown on non fertilised seedbeds. The disease may grow worse under influence of nitrogenous fertilisers, as the disequilibrium between root and shoot becomes still more pronounced.

The influence of green manuring on the outbreak of this disease has not yet been studied, but it may be expected that a combination of phosphates and green manure will do much to check severe results.

YIELDS IN DIFFERENT COUNTRIES.

There is a large difference in oecological conditions of rice growing in the tropics and subtropics. In the latter rice growing is restricted to the summer months by reason of the temperature. But this means that rice is grown in that part of the year in which the days have the largest number of sunshine hours. In the tropics the main crop is grown in the rainy season, only a comparatively small acreage being planted in the dry season, as there is no water available at that time to plant a larger acreage. The result is that in the main growing season only a few hours of sunlight are available per day, the day being shorter than in the subtropical summer and heavy clouds overhanging the sky often for many days (1).

This factor has a large influence on the production of dry matter by the rice-plant, but a still larger influence on the development of its roots. And for this rea-

(1) At Batavia (Java) the number of sunshine hours in the rainy season is not more than about 50 % of the available daylight hours, which gives not more than about 4 or 5 hours of sunshine per day.

son the plant can not make use of manures in the same way as is the case in sub-tropical countries.

Spain, Italy and California are especially favoured in this respect, Japan having its rainy season also in summer time. It is, however, very difficult to make comparisons between these countries for the reason that in the first three, rice being mainly a commercial crop, only the best adapted fields are used for rice, whereas in the oriental countries every field that can be irrigated is used.

Comparing, therefore, Japan only with other oriental countries we find for the yield per ha. for Japan 34.1 centner, for Siam 17.3, the Philippines 12.2, Indo-China 11.2 and Java 16.

We may expect that in Japan manuring plays an important part to get this average, but the numerous experimental fields in Java give by a liberal use of fertiliser yields that do not exceed the average yield of Japan. The highest yields there must be still very much larger.

It is at the same time interesting to see that the average yield of Korea is not more than 16.7 centner per ha. But it is known that the sky of Korea in summer-time is very much more cloudy than in Japan, often for many days at a stretch.

This question is of great importance, for, in tropical countries, it is often asked why even in the experiment fields, the high yields of Japan are not reached. It seems questionable if it is possible to reach those figures.

M. B. SMITS.

AGRICULTURAL ENGINEERING

Notes.

MEMORANDUM OF THE GERMAN GOVERNMENT AGRICULTURAL ENGINEERING COUNCIL ON THE NEED FOR TECHNICAL TRAINING FOR AGRICULTURISTS. — The March number of *Die Technik in der Landwirtschaft*, publishes a Memorandum of this Council (R. K. T. L.) on the need for developing engineering training particularly among peasant farmers. The inadequacy of instruction concerning farm machinery in Germany is emphasized and ways and means of rapidly introducing a widespread technical knowledge are discussed. The Memorandum has been revised and completed by the following organisations: German Peasant Farmers' Union — German Agricultural Society (D. L. G.) — German Agricultural Council — National Association of Agricultural Engineers — Agricultural Federation of the Reich — German National Industrial Association — National Association of the Farm Machinery Trade — Association of the German Agricultural Machinery Industry — German Engineers' Society — League of German Peasant Associations — and has been represented to the Ministry of Agriculture with a view to action being taken.

The Memorandum states amongst other things that agriculture to-day is not in a commercial sense an economic concern. On the great majority of farms, even if the ground, buildings and stock are well utilised the prices fetched by the produce no longer repay production costs. For many years the financial losses rendered inevitable by the unfavourable equilibrium between the high costs of production and the low prices for the products, together with increasing debt, have been symptoms of an economic decline amounting rapidly to a catastrophe.

This decline is due to the coincidence of two phenomena outside the range of influence of agriculture, namely, reduction of prices of agricultural products as a result of the overstocking of the world market and the increased net cost caused by the increased price of all the means of production including labour.

The reduction in the difference between production costs and prices of produce was so sudden and so unexpected by farmers that no new equilibrium corresponding to the new conditions has been found.

The facts that farmers do not know how to adapt themselves to the changed conditions, do not recognize the economic value of new methods and have insufficient know-

ledge of the technique of production as regards the choice and management of agricultural machines and implements, show that the problem of helping agriculture becomes a question of instruction, education and consultation.

In the present state of agricultural and engineering science to put agriculture on a new economic footing it is less a matter of procuring new machines and new methods than of developing the intellectual powers and capacities of the peasants.

The Memorandum demands:—

(1) *The establishment of courses for agricultural demonstrators* for the purposes of (a) convincing them of the necessity for engineering instruction — (b) supplying them with experimental material without defects which will enable them to give satisfactory instruction — (c) procuring closer collaboration in farm engineering in general and in particular between machinery experts and agricultural colleges and institutes;

(2) *the creation of Consultation Offices for Machinery in connection with the Chambers of Agriculture* for the purpose of: — (a) advising farmers about the purchase of machines — (b) giving advice to those intending to start power farming — (c) giving courses for agricultural demonstrators, officials and labourers — (d) acting as arbitrator in cases of differences between industrial firms and farmers — (e) collecting experimental data on machines on technical and economic lines;

(3) the creation of professional courses in order to: (a) develop professional skill — (b) give practical instruction on the management of machinery — (c) give practical instruction concerning small repairs — (d) deal with questions concerning spare parts.

DIESEL ENGINES FOR THE «HANOMAG» TRACTORS. — Investigations have been carried out under Prof. KÜHNE at the Agricultural Machinery Institute of the Polytechnic School at Munich on a new type of mass produced Diesel engine, in order to determine its efficiency, fuel consumption and heating properties.

Prof. KÜHNE gives the following summary of the results of the experiments:—

In the construction of the engine the difficult working conditions of a field or even a road tractor have been taken into account. All important movable parts are protected from dust and moisture. The fuel, lubricating oil and combustion air are freed from impurities by highly efficacious devices.

Trials of the engine showed it to possess great elasticity and — a highly desirable quality for a tractor engine — a large reserve force above the normal horsepower. Moreover the engine is economical in fuel, using its calorific power to the full. (*Die Technik in der Landwirtschaft*, Berlin 1931, Nr. 3, S. 83-87).

THIRD COMPETITION OF MECHANICAL ART APPLIED TO THE INDUSTRY OF THE SOIL, LAUSANNE, SEPTEMBER 1931. — The Institut International de Mécano-Culture (I. M. C.) of Lausanne, is organising another competition in connexion with power farming on small holdings not exceeding 15 ha. and having no draught animals.

The problem set is as follows. A farmer having no draught animals requires a complete mechanical equipment to work his farm of 15 ha. distributed thus:— 1.5 ha. natural grassland, 2 ha. sown meadow, 1 ha. vegetables, 3 ha. root crops or sugar beet, 0.5 ha. vineyard and 7 ha. cereals. The ground is divided in plots sometimes not reaching 0.5 ha. and the slope varies up to 35 %. The farmer will utilise his plant for the interior work of the farm and for transport.

No type, characteristics or dimensions are fixed. Competitors are free to select the source of power which seems most suitable.

The competition is open exclusively to the countries which are members of the League of Nations.

Entries should be sent not later than 15 August 1931 to the Institute (rue Pichard 13, Lausanne), which will on application procure the Regulations for the Competition.

DEVELOPMENT OF THE MECHANICAL MOWER IN GERMANY. — The recognised mowers have not hitherto given satisfactory results in Germany. Certain fairly satisfactory types are sold but they do not yet correspond to the requirements of the great majority of peasants.

For the further development of mowers it is necessary in the first place to utilise the experience obtained in the construction of tractors, but also to improve the working of the cutter bars. Also it is necessary to decide whether the mower is required to replace the heavy work of the horse or merely to save labour. Both purposes require a wheel which is readily adaptable for road or field use. The cost of purchase should if possible be still lower than the present.

The writer, M. GALLWITZ, gives details concerning the working of the cutter bars in mowers and harvesters, the combination of mechanical mowers and small tractors and the economic practicability of various types of mower. (*V. D. I. Zeitschrift*, Berlin 1931, Nr. 11).

MACHINE HARVESTING OF POTATOES. — This problem is nearing a solution in Germany. Machines are in use built with the help of the "Reichskuratorium für Technik in der Landwirtschaft" (R. K. T. L.) which deposit the potatoes in heaps or else load them on to carts. But the chief interest centres in the new SEEST machine which has some important innovations. The share is wider and divided into 6 parts; the clod falls directly behind the share on to a shaker grid which separates the tubers from the soil and from the haulm. This new machine is not yet ready for mass production but trials have shown that the difficulties can be overcome.

By building tractor-drawn harvesting machines the economy of cereals and potato farms will be profoundly modified for there will no longer be temporary large labour requirements and complete mechanisation will no longer be impossible. (*Die Technik in der Landwirtschaft*, Berlin 1931, Nr. 3, S. 75-79, 87-89).

H. J. H.

ANIMAL HUSBANDRY

The Development of Beef Cattle Raising in the Range District of the United States (I).

Up to the present the world crisis in agriculture has been felt more keenly by crop production than by animal production. Although stock breeding products have suffered a fall in prices the fall has been less than that of crop products; stock breeding is, moreover, helped by the fact that its raw materials, *i. e.*, feeds, are bought at prices which are correspondingly lower than those obtained for its products. The fall in prices can be readily compared in the following table.

TABLE I. — *Fall of prices of different agricultural products.*

Products, Markets and Descriptions	% fall in the prices of December 1930 compared with those of	
	January 1930	1928 (or commercial season 1927-28)
Wheat: Winnipeg, N. 1 Manitoba	57	62
Rye: Minneapolis, N. 2	50	58
Barley: Winnipeg, N. 4 Western	56	72
Oats: Buenos Aires, Plate	48	72
Maize: Braila, Danubian	25	60
Rice: London, Italian N. 6 good	28	37
Coffee: Santos, N. 4 Santos	41	63
Cacao: London, Accra	31	50
Tea: London, Indian, medium to good	(- 12)	3
Sugar: New York	36	48
Cotton: Liverpool, Sakellaridis f. g. f.	44	58
Hemp: Italy, medium	48	56
Rubber: London	39	58
Wool: London, Victoria	41	60
Silk: Milan, unmanufactured "Classiche"	35	49
Beef: London, chilled	14	9
Beef: London, frozen	24	2
Pork: Denmark, fresh	41	33
Mutton: London, chilled	20	19
Butter: Copenhagen	22	29
Butter: Lon-lon, New Zealand	30	36
Cheese: Alkmaar, 40 l	20	27
Cheese: London, New Zealand	27	38
Eggs: London, Danish	0	7

(From the *Monthly Crop Report and Agricultural Statistics* of the International Institute of Agriculture, Rome, February 1931, Year XXII, No. 2, p. 124).

(1) A series of articles will be published on the observations of the writer on stock breeding, and cattle in particular, during a recent tour in the United States. (*Ed. Note*).

Table I shows clearly the more favourable situation of animal products as compared with crop products. Whereas the more important crop products show in December 1930 a reduction of from 37 to 72 % in comparison with 1928 prices (with the exception of tea, the price of which fell by only 3 %), the reduction of prices for stock raising products was from 2 to 60%, and of cattle products in particular from 2 to 38 %; the least reduction was in the prices for beef (2 to 9 %).

The relatively favourable prices for products of cattle farming conceals the danger of world agriculture in its search for profitable branches of production turning *en masse* to cattle farming. It is beef in particular, as has been shown above, which shows the most favourable returns.

In these circumstances it would seem of interest to know something of the development of certain types of cattle farming which play an important part in the world's meat supply and by their huge production are bound to exercise a great influence on prices. Though meat production in the United States is principally described here, much of the matter is equally applicable to other important meat producing countries. The United States, moreover, though to-day not putting much beef on the world markets is however the largest beef producing and probably also the largest beef consuming country.

To understand fully the beef cattle industry in the United States, it is necessary first to comprehend the general outlines of the country's agriculture and its comparatively short history. A somewhat common characteristic is a pronounced specialisation. This is not only shown by the fact that whole regions are limited to the production of certain products for which they are by climatic and economic reasons specially adapted, but also by the fact that the various farmers select one or other branch of production in accordance with their own predilections or knowledge. This characteristic is particularly noticeable in California, where the climate allows of many agricultural products in the same region but where specialisation is however acute.

In the United States there is not only a clear separation of dairy from beef cattle production but the latter is often subdivided again, there being a separate industry for breeding and for fattening. Fattening is practised on different farms and often in an entirely different part of the country. Of course beef obtained as a by-product of dairy farming has also a considerable importance on the market; there are also undoubtedly a number of regions and farms where there is no such specialisation and an equal importance is attached to milk and beef, breeding and fattening, but these exceptions merely emphasize the fact that large stretches of the country specialise in breeding beef cattle and others in fattening cattle shipped in from the breeding districts.

Cattle breeding in the range country. --- The range district of the United States is the region extending from longitude 100° W to the west slopes of the Rocky Mountains in which cattle and sheep breeding constitute the only possible means of utilising the sparse growth of vegetation; the region is characterised by a continental climate with an extremely low rainfall which is practically everywhere the limiting factor in agriculture and stock breeding. Within this vast territory there are great differences in climate and soil. The climate varies from north to south, from east to west (the rainfall increasing gradually from east to west) and also according to altitude, there being a range in level of from a few feet above sea level to over 5000 feet in the Rockies.

Certain regions are in better conditions by reason of their situation in relation to the mountains and forest grazing or dry farming is possible. Rivers make ir-

rigation possible in other regions which thus have a flourishing agriculture. But the greater part of the region is arid or semi-arid. The scanty natural vegetation however allows of cattle and sheep breeding, and the great extent of the region gives it importance in the meat production of the United States.

Within the range district, properly so-called, there are still enormous differences in the possible utilisation of the land. Many parts are absolutely desert while others offer relatively good forest pasture. Climatic differences as well as altitude cause variation also in the season and duration of grazing, so that summer, winter and year-round pastures are distinguished.

It is only during the last hundred years that this region has been exploited, if the insignificant herds introduced earlier into California by Spanish missionaries are left out of account. The first stock came into the range country from the south, while ranches were established in western Texas to supply the market of New Orleans and other herds came into New Mexico and Arizona from Mexico. The northern part of the range country was not used until 1860 for the beef cattle production which was the pioneer of the advance of civilisation from east to west. Cattle brought by the gold seekers about 1870 had a considerable influence on the development of the industry because they attracted attention to the great possibilities of the country for meat production. Large ranches were formed and considerable capital devoted to this promising new field. This boom of stock, however, which was not accompanied by sufficient knowledge of the characteristics of the country, resulted in overstocking of pasture and inadequate protection from weather and subsequent heavy losses. Towards the end of the nineteenth century cattle diminished therefore and it is only of recent years that the production of beef cattle in the range country has been studied with a view to the rational utilisation of the grazing land. Considerable technical and economic progress has already been achieved, but further problems still await solution. The aim of the present article is to discuss the present state of these problems in theory and in practice.

Improvement of pasture conditions. — One of the most urgent problems facing the research worker desiring to improve beef cattle raising in the west was the unsatisfactory state of the grazing, which during the boom period at the end of last century in most cases was overstocked. A solution of this problem is being actively sought but there are many difficulties in the way, the most fundamental consisting in the land tenure conditions in the country.

Conditions of land ownership in the range country. — The further west one penetrates into the range country properly so-called, the smaller is the area under private ownership, that is with the exception of irrigated areas and areas under dry farming or where agriculture is possible. The greater part of the land is U. S. Government property and is divided into public domain, national forests, national parks and Indian reserves. A much smaller part of the land is owned by the various States. The railways companies own land along the lines which is relatively extensive as well as of higher value owing to better transport facilities.

The public domain consists of land not yet divided or sold which the Government allows by passive consent to be grazed. When such land however is proclaimed national forest by the U. S. President the consent terminates and the administration of the land passes to the Department of Agriculture in Washington and comes under the regulation of the Use Book for grazing of national forest. These regulations are carefully drawn up and guarantee the protection and improvement of the pasture in the interests of stock raising and the protection of the rancher

against unfair competition in the utilisation of pasture. Grazing rights are subject to certain conditions and to the payment of a small sum per head of stock. The grazing rights in the national forests are thus regulated in the interests of all and the Government and the stock-owner are each responsible for a part of the necessary improvements.

Similarly a part of the public domain may be declared a reservation, generally an Indian Reservation. In this case also the Government remains owner of the land and generally leases the existing grazing.

A considerable part of the one-time property of the Government was conceded to the railway companies when they were granted concessions for railway construction; the companies sell part of the land, rent part and hold part.

Thus although for a great part of the Government property the problem seems to have been more or less satisfactorily solved, this is not the case for the uncontrolled lands of the public domain. On those lands there is still a continual struggle between herd owners for the use of grazing, which is a situation which pleases no one and prevents any improvement of the pasture. This as yet unsolved problem has in recent times given rise to much discussion, although the land still remaining public domain represents the least valuable part of the old Government property which, in addition to the concessions and reservations already mentioned, has been largely granted to ex-soldiers. The remaining land is however mostly utilisable as pasture and the lack of care it receives not only contributes to its own deterioration but is also a menace to neighbouring well cared for land. As a result of former excessive grazing the vegetation has become increasingly scanty and now allows erosion and leaching to add to the destruction. Also the multiplication of destructive rodents in consequence of the hunting of wolves and their other natural enemies, and the replacing of good grasses by every kind of weed, complete the devastation.

Table II shows the extent of the areas in question, indicating the land owned by the United States Government in the 15 Western States on 30 June 1928.

TABLE II. — *Government property in the 15 Western States on 30 June 1928.*

National forests	132,890,000 acres
Indian reservations	69,000,000 "
Controlled public domain	138,890,000 "
Non-controlled public domain	54,530,000 "
Total	395,310,000 acres

These figures show that out of the total territory of the 15 States considered (part of which is not within the range country proper) about 42 % is Government property and about half of this again is public domain.

G. STEWART discusses the problem of public domain particularly as it concerns Utah, but practically the whole of his remarks are equally true for other States. He has studied the possibilities of using these areas and has reached the conclusion that only 3 methods merit serious attention, namely (1) leasing the land to ranchers, as has already been done on a large scale in Texas and to a lesser degree also in Wyoming; (2) granting grazing rights in the same way as for national forests; (3) dividing the land into plots and distributing them to different ownership after classification. At a conference of scientific workers in Utah in 1924 the opinion was expressed that for Utah the best system would be an administration of the public domain similar

to that of the national forests, recognising grazing rights under certain conditions, but that first certain land should be conceded as private property, giving preference to the owners of land proved capable of supporting hay or hay and grain.

While the problems of land tenure still await solution technical experts in the United States are actively studying the internal organisation of a ranch in the range country with a view to stabilisation and rationalisation.

Stock carrying capacity of the range country. — As has been mentioned above the pasture in question has been considerably damaged in the past by overgrazing. It may be asked therefore what quantity of stock may safely be carried.

The problem is complicated by the fact that it is closely related to weather conditions, which vary greatly from year to year. Grazing which one year is able to support comparatively large herds may the next be able to carry far fewer. Thus the question becomes that of determining the number of stock which can be carried under the least favourable conditions without fodder reserves. Most writers discussing ranch organisation recommend having sufficient provision of hay or other fodder to prevent loss of stock in case of shortage. Such provision is easy where the ranch has mowing meadows at its disposal. But even when there is an adequate fodder reserve an economical organisation of the ranch demands that no larger number of stock should be kept than can *normally* be supported by the available acreage of pasture. To give an idea of the large areas necessary on this thin grassland the following table shows the acreage required per head of stock.

TABLE III. — *Carrying capacity of range pasture.*

	Duration of grazing period	Area per cow
Great northern plains	5 to 8 months	15 to 25 acres
Great southern plains	5 " 10 "	15 " 25 "
West and north-west Montana	3 " 7 "	35 " 40 "
Northern Rocky Mountains	3 " 6 "	60 " 150 "
North-east Nevada, south Idaho and central Oregon	4 " 8 "	35 " 40 "
Wyoming, semi-desert part	2 " 4 "	50 " 100 "
Utah, hills and valleys	5 " 7 "	25 " 30 "
Nevada, semi-desert part	1 " 4 "	75 " 150 "
Basin of Columbia	7 " 9 "	10 " 30 "
Mountain valleys of California and Oregon	6 " 8 "	10 " 25 "

Pasture improvement. — Improvement of the grassland is possible by the introduction of systematic grazing, which in its turn depends on fencing and water supply. A rational rotation of grazing exists only very rarely in the ranches of the West. Often it is necessary to establish reserve pastures when the ordinary pasture requires to be allowed to renew its growth. A rational system for the utilisation of the present grassland must aim at a uniform grazing which allows of a continuous renewal of growth. A detailed study of the grassland flora in different regions, such as has already been begun in several places, will lead to the adoption of measures which will encourage the growth of desirable grasses and decrease the less desirable ones.

The fact that at different altitudes and in different regions the grazing period falls at different seasons permits of a rational utilisation of the range by a migration of herds in some ways similar to that which takes place in spring and autumn in the mountainous regions of Europe.

Fencing. — Fencing in the immense areas of the range is a factor of considerable economic importance. Only privately owned or rented land is enclosed, while the vast stretches of public domain and national forests are open range, so that the question of fencing is connected with that of property. Fencing is the only effective guarantee of grazing exclusively by the rightful owner or tenant and protects stock from beasts of prey, allows of protection of the pasture and of the improvement of stock by pedigree bulls, etc. Fences increase in number gradually from east to west. But even when fencing problems are solved from the point of view of ownership regulations, there remains the technical difficulty of how best to arrange the enclosures with relation to water supply so as to secure a uniform utilisation of the pasture. The best solution seems to be that several enclosures (usually 4) should meet at one watering place, so that the animals can reach the water without crossing any fence. The economic importance of fencing on the ranch is shown by the fact that the average cost of enclosing 127 ranches in New Mexico was 3 dollars 90 cents per head of cattle.

Water supply on the range. — The watering facilities are in close relation to the grazing efficiency of the pastures, since cattle do not usually move more than five miles from the watering places. On the other hand the number of the watering places has a certain effect on the quality of the grazing land which tends to suffer if facilities are meagre since the area in the neighbourhood of a watering place is naturally much more heavily grazed and trampled. In respect of this latter point, the quality of the water is also of importance. Observations made in New Mexico by A. L. WALKER and J. L. LANTOW show that the animal will drink more at a time of good water than of bad, and accordingly can graze further afield without the necessity for continual returns to the drinking place. Thus the supply of drinking water has a noticeable influence on the development of the vegetation.

The water supply is a serious problem because the greater part of the range country is very short of water and its provision by artesian wells, pipes, tanks, reservoirs, etc. is very costly. A study of 127 ranches in New Mexico showed that the total costs of supplying water by wells, pipes, etc. came to 3 dollars 57 cents per head of cattle. Much further work and investigation is required to find a satisfactory solution of this problem.

Calf Yield. — One of the most important factors in the economical running of a ranch is the percentage of calves produced annually per head of cows. A number of studies have been carried out on the subject. According to KLEMMEDSON who studied the question in 1922 on a large number of ranches, the production costs per calf vary according to the number of calves produced¹ as shown in Table IV.

From these examples and others G. H. HART & R. R. GUILBERT have shown that a higher yield of calves greatly reduces the costs of production. It is evident that an increase in this yield is one of the most desirable methods of improving the exploitation of the ranch. The yield is often very low.

In Texas KLEMMEDSON calculated an average yield in calves of 56 % on 17 prairie and 24 mountain ranches, but the yields really vary from 33 to 83 % on prairie ranches and from 36 to 76 % on mountain ranches. In Nevada the yield in calves varies from 25 to 95 % with an average of from 51 to 66 % according to the situation. In Arizona STANLEY estimated for 63 ranches an average yield of 32.14 % in 1925, but this was a most unfavourable year. The average for a series of years would be about 40 %. But in Arizona also the yield in various ranches

TABLE IV. — *Comparative production costs per calf in 5 neighbouring ranches in Colorado.*

Ranch No.	Yield in calves	Gross cost per calf
7	70 %	32.50 dollars
2	87 "	39.78 "
14	56 "	52.02 "
40	51 "	45.11 "
13	36 "	66.12 "

has been known to reach 85-90 %. In New Mexico according to WALKER & LANTOW the average yield in calves of 127 ranches was 57 % in 1927. In California according to ADAMS in 1924 it was 67.3 % for 32 ranches with variations of from 50 to 90 %.

These figures show that the present yield in calves is still far below the possible yield. A number of writers have studied the causes of the low yields and means of improving them.

The yield in calves depends in general on the condition of the stock, the season of service, the ratio of bulls to cows, the area grazed, selection and finally disease, particularly contagious abortion.

The condition of the animals as regards feeding depends in its turn on the acreage of available range, the number of stock carried and supplementary fodder (of which more will be said later). As it is relatively difficult to provide sufficient supplementary rations for the whole herd the system of feeding bulls separately before the period of service is being increasingly adopted. In this practice the bulls are removed from the herd in autumn and kept in enclosures until spring. This also produces the result that the calves are born in spring and are not too young at the time of their first winter, which is particularly important in the northern part of the range country. These two measures form part of what is called in America controlled breeding.

The number of bulls in relation to the number of breeding cows is of great importance. At the present time the number of bulls is still often much too small, which partly accounts for the low yield in calves. Over the vast extent of the ranches the bulls must cover much ground to join the cows in heat, consequently effective service depends less on the reproductive capacity of the bull and cow. While in controlled conditions one bull can serve 60 to 70 cows, on the ranch the number is much lower and often according to PARR, COLLIER & KLEMMEDSON may be no more than 15 in the south-west of the range country. On the plains if the drinking places are few or the grazing is good and so more heavily stocked, each bull finds a much greater number of cows to serve. According to VASS the number of cows per bull varies in certain ranches studied in Wyoming between 14 and 88, whereas the right relation would, according to him, be 20 cows per bull.

It goes without saying that the quality of the bull and its condition are not without importance. The bulls should be carefully selected for quality and reproductive capacity, which frequently however is not done as yet. In general a bull should not be used for reproduction under 2 years of age and should be treated with care during the first year. Of recent years the use of bulls registered in the herd-books has been much recommended, with the result that the number of registered bulls has greatly increased, though it is still low as compared with the total number of bulls.

A certain amount of selection is also needed among the cows. Those which do not calve should be removed for a time from the breeding herd, as also those which are too old.

Much is being done to combat the still widely spread contagious abortion, and it is hoped to be able to control it in the near future.

There are thus a number of possible methods of improving low yield in calves in the range country. Now that the importance of a good yield for the total output of the ranch has been recognised it may be expected that all means will be taken to obtain the highest yield possible.

Supplementary rations and winter fodder. — As has been said above supplementary feeding plays an important role in the development of beef cattle production in the range territory. Though grazing is the basic means of feeding, the climate demands that the lives of the stock are assured by supplementary fodder. In the northern part of the region it is essential for the wintering of stock; it affects the carrying capacity of range; it increases the yield in calves and prevents heavy loss of weight in the stock when the grazing is meagre.

The methods of supplying fodder in winter vary in different parts of the northern range country. In most cases ranches have at their disposal some land in a more favourable climate or which can be irrigated to furnish fodder crops, but the natural prairie is also used for hay to some extent.

The extent of fodder crops is relatively greater in the smaller ranches. An enquiry in the Great Plains, *i. e.*, the eastern part of the range country proper, provided the figures given in Table V.

TABLE V. — *Acreage of farming and grazing land by number of cows per ranch.*

Number of cows per ranch	Number of ranches considered	Average acreage	
		farming land	grazing land
Less than 50	68	294 acres	1500 acres
50 to 100	104	344 "	2489 "
100 " 200	77	378 "	5314 "
200 " 450	46	516 "	13300 "
Over 450	9	930 "	18436 "

The further west one penetrates into the range country, the smaller (except in California) are the areas under cultivation in the ranches. In the north hay is the most important fodder crop. In addition to wild hay the animals are fed alfalfa hay, straw and sorghum, though the two last are of less importance. As concentrated feeds maize, oats, rye and a little barley are fed particularly in the north.

For rationing purposes the different ages as well as the cows, bulls and calves are separated. The enquiry previously mentioned on the Great Plains produced the following figures (see Table VI) for the average quantities of fodder fed to stock.

Thus bulls receive most supplementary fodder and 2-year-old feeder steers receive least. In the region in question the supplementary feeding of cows begins in December or early in January; but the time and duration of winter feeding depend entirely on the weather. Usually it lasts about 150 days.

In general the fodder is produced on the ranch and only rarely bought. In

TABLE VI. — *Mean quantities of fodder in tons fed annually per head of stock in ranches on the Great Northern Plains.*

	Alfalfa hay	Wild hay	Other roughage	Grain
Cows	0.55	0.63	0.47	2.22 bushels
Bulls	1.63	1.41	1.51	11.41 "
Calves	0.45	0.38	0.50	3.64 "
Yearlings	0.38	0.45	0.53	5.02 "
Two-year-olds	0.26	0.47	0.38	1.11 "

fact the great distances and the resulting high costs of transport make bought fodder very seldom a paying proposition.

The area devoted to producing hay and growing fodder crops has increased of recent years and is still increasing. The utilisation in this way of land which is adapted to it is recommended by the authorities, in order to ensure sufficient fodder to make ranching more stable and to prevent overstocking of range. The authorities however discourage an extension of cultivation for the purpose of increasing the herds. Fodder should be only a *necessary* supplement to grazing. Cattle farming based on cultivated fodder in the range country is not in general profitable on account of the high cost of labour and the frequently unfavourable climate.

In the southern part of the range country conditions are quite different. The absence of snow and the continuous growth of grass make it possible to do without supplementary feeding by means of a suitable rotation of grazing, particularly when the ranch has both plain and mountain pasture as is usually the case.

In this territory in each case it has to be considered carefully whether or not it is advisable to grow or buy fodder for the sake of keeping a few more cows. The answer depends primarily on the position of the ranch and its conditions, on the possibilities of growing fodder and the expense of buying it. Supplementary feeding of bulls before the breeding season is however advisable everywhere.

Ranches which supplement the grazing feed first wild hay, then small quantities of alfalfa hay and mixed grain hay. As concentrate less grain is fed than cotton seed cake bought from the neighbouring cotton belt. In the north-west of New Mexico about 42 pounds of cake are fed per head annually. Sorghum is the chief grain.

In California and Arizona also, where the cottonseed oil industry has developed of recent years, cake is fed in large quantities to the stock and considerable quantities are sent into Nevada.

Breeds and Selection. — The practice of slaughtering young fat stock, of which more will be said below, has a strong influence on the selection of breeds and breeding stock in beef cattle ranching in the United States. In beef cattle shows nowadays 1- to 2-year-old animals are exhibited mostly which encourages selecting more for early maturity and fattening ability.

The aim nowadays is to produce the type of exhibition stock, which is low set, with fine bones and a small head and characterised by rapid growth and early maturity.

Three main breeds of beef cattle are now bred in the United States:— the Aberdeen Angus, the Shorthorn and the Hereford. The first approximates closest to the ideal type, but Shorthorns and Herefords adapt themselves more readily to the rough conditions of the range country. Thus the black Aberdeens are more confined to the farming districts of the East and Middlewest while Herefords are

bred all over the West. Shorthorns are found in great numbers throughout the United States. The Galloway and Devon breeds which were formerly bred in large numbers are now rare, and the primitive Texas cattle have almost completely disappeared; although a great part of the present stock of beef cattle are graded up on Texas cattle blood.

Brahman cattle (zebu) breeding has become important along the coast of the Gulf of Mexico because these cattle can withstand climatic conditions unsuitable for other cattle and are practically immune from Texas fever which has caused tremendous losses in the south. They lend themselves readily to fattening and yield beef which can compete with that of other breeds. They are also remarkably prolific.

Castration. — The castration of male stock not wanted for breeding purposes is a current practice, though the spaying of female stock is rare. This operation which no longer presents any technical difficulty is without doubt useful in ranching to prevent undesirable breeding, but represents a great increase in work on large ranches on which castration, dehorning and branding of male calves already represent a large proportion of the necessary labour.

Animal losses on ranches. — Losses are closely connected with what has just been said about the improvement of range conditions and supplementary feeding of the herd. How important this improvement still is is shown by the fact that losses of cows often reach 23 %, as occurred in 1923 on a Colorado ranch.

The chief causes of such losses are starvation, storm, poisonous plants, predatory animals, disease, parasites and theft.

The greatest losses of stock occur in winter and early spring as a result of storms and shortage of grazing and may be greatly diminished by a rational exploitation of grazing land. Poisoning is usually caused by over-grazing and may be similarly remedied. Fencing will help towards reducing losses and will check to some extent the spread of epizootic disease.

The prevention of most of the epizootic diseases (e. g., blackleg, anthrax, contagious abortion), which still cause havoc among the stock in the range country is now possible by means of vaccination. The general use of such preventatives would greatly diminish the losses. In the coastal region of Texas and in certain parts of the south-eastern States, Texas fever still exists but control has been successfully accomplished and in a few years it will be a thing of the past.

Market age of stock. — A question much under discussion at the present time is the age to which calves not intended for breeding should be retained on the ranch.

The ranch sells its young stock either directly to the butcher as grass fed animals or to the feeder, unless fattening is practised on the ranch as is the case in the eastern parts of the range country, in California and in the districts bordering on the irrigated or dry-farming areas.

Not long ago the rancher aimed at raising animals to 2 or 4-years-old before selling them as fat stock for slaughter, but now he tries to obtain largely calves and yearlings which are sold at from 10 to 18 months. This is specially the case in the eastern territory. The question of the best age for fattening and for slaughter is still the cause of much controversy among experts, and is important for the beef industry and probably also for the meat market.

It cannot be denied that meat markets in the United States at the present time prefer rather small animals. The increasing number of small families and

the fact that the American consumer nearly always buys whole cuts result in a demand for small animals.

It is also beyond argument that young stock is more easily fattened than old so that a given live weight can be produced at a lower price in young than in old animals, provided that the feeder buys at the same price per unit of live weight.

The problem is different for the rancher. If he desires to market calves immediately or shortly after weaning instead of as 2- or 3-year-olds, he must have a larger herd of breeding cattle to produce the same live weight. But, according to VASS, the feeding and care of breeding stock are much more costly than of young feeder cattle. Moreover it must be taken into consideration that to increase the breeding herd the rancher must either keep animals that he might have sold or else buy stock for breeding. Thus, although older animals profit less from the food the sale of younger animals will be an advantage for the breeder only if the feeder pays for young stock at a higher rate.

In most instances this however is not the case with the result that in the markets of the west much greater quantities of 2- to 3-year-olds than of yearlings are still sold.

As appears from the fact that shows exhibit only young stock as the ideal for fattening, there is however a tendency to produce younger animals and doubtless market conditions will change up to a certain point in favour of young stock. Thus the optimum age of marketing for the breeder will gradually decline.

This change is of the greatest importance not only as regards the technique of breeding and fattening, but also for the development of the meat market. The fact that the live weight of much slaughter cattle is lowered from above 2000 to 1000 pounds or less necessitates a greater head of stock to supply the same quantity of meat to the market. The figures during recent years however do not for the moment show an increase but rather a decrease in the number of cattle. The last two years have shown a slight increase while there has been a steady fall in the number of animals slaughtered since 1926. It may be that the number of slaughter cattle diminishes because of more rapid fattening and earlier slaughter, and that the breeding stock is gradually increasing.

An increase of cattle slaughtered should, as appears in Table VII, correspond to the reduction in head of stock which took place up till 1926-27, whereas during the last two years the increase in head of stock was accompanied by a fall in the number slaughtered.

TABLE VII. — *Development of head of cattle slaughtered, of production, import, export and consumption of beef in the United States from 1910 to 1929.*

Year	Head of cattle in thousands	Total No of cattle slaughtered in thousands	Beef production (total dead weight) in millions of lbs.	Beef		Consumption of beef	
				Imports in millions of lbs.	Exports in millions of lbs.	total in lbs.	per head of population in lbs.
1910.	6 682	13 541	6 703	111	—	6 561	71.7
1920.	68 764	13 885	6 713	155	43	6 715	63.1
1925.	59 122	14 716	7 146	39	17	775	62.2
1926.	56 832	14 971	7 458	38	41	7 454	63.6
1927.	55 676	14 000	6 826	34	82	6 926	58.4
1928.	56 467	12 452	6 082	24	121	6 210	51.7
1929.	57 967	12 241	6 005	27	138	6 247	51.4

Table VII does not give an accurate idea of the proportion of beef cattle in the United States because it includes also dairy cattle of which beef is only a by-product.

If only beef cattle are considered a still greater reduction in head of stock is found. From 30 million in 1910 the number of beef cattle rose to 38 million in 1919, to fall off again steadily to 23,800,000 in 1929. A similar tendency is apparent on the markets: the maximum number of cattle (24 million) was reached in 1925 and from then on it has descended to a little over 20 million.

The tendency to slaughter cattle young has not yet made its full effect felt on the meat market. The average weight of animals slaughtered has remained of late years almost the same (about 950 lb. per head), while the dressing percentage was about 54 %. The relatively low weight of the animals slaughtered may be explained by the fact that large quantities are sent to the slaughter-house either not fattened at all or grass fed, and are naturally much below the average weight. If the tendency to fatten young cattle for "baby beef" becomes accentuated, this average will decline still further.

Further reference will be made to this tendency to produce baby-beef in connection with the fattening of cattle and any conclusions as regards the influence this tendency may have on the breeding of beef cattle and on meat market conditions will be reserved for a later article.

Development of beef cattle production in the United States. — As appears from Table VII, the production of cattle and in particular of beef cattle in the United States shows, from 1910 onwards, a considerable decline, which must be attributed to numerous causes of technical and economic character which cannot here be given in detail. There is a considerable decrease in consumption of beef in the States corresponding to this decrease in production. The consumption per head of population has decidedly diminished, but owing to the growth of population there is not an equivalent diminution of the total consumption. At the same time the decline in production has gone further than that in consumption with the result that the beef requirements of the United States are not completely covered in the country itself, although a short time ago export was still possible at least of small quantities.

Export possibilities of meat produced in the United States are also limited by the keen competition on the world market, so that it is very probable that production will in future be confined to meeting the needs of the national market.

Conclusions. — The over-stocking of the pasture lands in the range country of the Western States has much reduced their carrying capacity, while it has also resulted in heavy losses of stock and in a considerable decrease in the head of cattle.

Of late every endeavour has been made to re-establish breeding in this area and on a more secure basis.

Great breeding possibilities undoubtedly exist. The measures already taken to restore the industry over extensive areas are as follows.

1. An improvement of the quality of the range by a systematic utilisation and avoidance of over stocking. To effect such improvement it is necessary: — (a) to regulate conditions of land tenure, which over large portions of the area under review are not yet legally regulated — (b) to fence extensive range — (c) to introduce a rotational grazing system or reserve pasturage so as to safeguard the regeneration of vegetation — (d) to make a study of the vegetation of the range pasture with a view to taking measures for protecting and encouraging growth of desirable and for checking that of undesired plants — (e) to study carrying capacity with a view to avoidance of over-stocking — (f) to regulate the water supply.

2. An improvement in cattle by: — (a) the use of pure bred animals — (b) scientific selection of breeding stock.

3. Increase of calf yield by: — (a) controlled breeding — (b) preparation of bulls, and if necessary also of cows by means of supplementary feeding — (c) giving more importance to breeding capacity in the selection of the breeding herd.

4. Decrease of cattle losses: — (a) by rational utilisation of grazing land — (b) by supplementary feeding in the event of shortage of pasture — (c) by effective control of epizootic diseases (vaccination, etc.). — (d) by the provision of shelters against weather.

These means of improving beef cattle ranching are directed rather at stabilisation than at any increase in the quantities of live weight produced.

Introduction of scientific methods of ranching on the range area really represents a limitation in production. There can in fact be no idea of intensifying production, in view of the low density of the population of the range territory, the distance from meat markets and the general economic situation of the region.

STEFAN TAUSSIG.

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Articles in *The Producer*, Denver, Colorado, 1930.

BOOK REVIEWS *

Agricultural Engineering.

STUDIATI P., *L'elettricità in agricoltura*, 47 p., fig. Piacenza 1931, Federazione Italiana dei Consorzi agrari.

[An illustrated pamphlet on electricity and its use on the farm intended for farmers who have not sufficient acquaintance with electric engineering. The chapter headings are: — What is electric power? How is it transmitted and how is it measured? — How is electric power produced? — A general survey of electrical applications on the farm. Pumping plant — Electro-tillage — Other electrical applications (Electric power for threshing machines, mills, oil presses, etc. Electricity as a source of heat, etc.).]

BUSCHKIEL C., *Die Elektrizität in der Landwirtschaft*, 171 S., 185 Fig., Preis 5,50 RM. Berlin 1931, Walter de Gruyter & Co.

[This small volume is abundantly illustrated and is also designed to provide farmers with the information they require for the understanding and management of electric power installations. It is divided into chapters dealing separately with: — Fundamental theory of electric engineering — Production of high tension currents — Use of such currents in agriculture — Installation of plant and its use in farm buildings — Installations with low tension current — Economic considerations]. H. J. H.

Animal Husbandry.

Index of Research Work on Animal Nutrition throughout the Empire, compiled at the Imperial Bureau of Animal Nutrition, Rowett Institute, Aberdeen (Scotland), February 1931, 83 p., Appendix (2 p.).

[The preparation of this valuable document was undertaken by the Imperial Bureau of Animal Nutrition as one of its functions under the scheme of the Imperial Agricultural Bureaux. (See the *Monthly Bull. of Agric. Sci. and Practice*, 1929, No. 1, Bibliographical notes under the various headings). The greater part of the information is based on material supplied by the special Correspondents.

Part I is arranged according to countries and contains particulars of the work being carried out in the institutes dealing with animal nutrition research throughout the Empire.

Part II is arranged according to subjects and gives the institutions carrying out research on the following: — (1) physiology of nutrition, avian and mammalian; (2) energy requirements of animals — calorimetry; (3) feeding experiments with various farm species; (4) foodstuffs: chemical composition, nutritive value and digestibility tests; (5) malnutrition and disease (deficiency and infectious diseases); (6) mineral metabolism and mineral requirements of animals; (7) milk: composition in different species and variations in; (8) normal conditions of animals: rate of growth and food consumption; (9) pastures and fodders; (10) protein metabolism and protein requirements of animals; (11) silage; (12) vitamins and light; (13) wool: composition, and effect of feeding, climate, etc. on rate of growth and quality.

Part III deals with human nutrition in native races, particularly in the tropical and sub-tropical parts of the Empire. The Bureau has included the data available under this head because of the correlation already established between problems of dietetics and of the feeding of farm animals, and because of the necessity for further correlation of work in these two fields of research.

A list of the official correspondents of the Bureau is given in an appendix.

The Bureau proposes to publish a bibliographical supplement containing references to and abstracts of articles and other publications on work connected with the problems mentioned in the *Index*. S. T.

FAELLI F., *Allevamento dei suini*, 376 p., 95 fig. Manuali Hoepli, Milano 1931.

[This practical guide for the pig breeder is a 2nd edition of the handbook which appeared under the title of *Il Porco*. After a short account of the science of pig breeding the author describes the main breeds and those bred in Italy. Instructions are included on the management of pigs, their feeding and utilisation, also suggestions for the encouragement of pig breeding]. E. M.

* Under this heading short synopses are given of books sent for review.

SYLVICULTURE

Composition of Virgin Forests in the Temperate Regions.

The perpetual intervention of man in the life of virgin forests, an intervention primarily due to human greed, is the real explanation of the efforts that are being increasingly made to gain a knowledge of the physiology and biology of primitive forests, the object being to arrive at conclusions that will serve as a guide in the treatment of forests worked under management schemes. These scientific investigations, and the literature relating to them, serve to demonstrate the vast importance of the immense and so far unexploited wealth of the virgin forests, and to draw attention to the deplorable results of the inconsiderate laying waste of these forests, especially in the areas — in particular in South-Eastern Europe — where the virgin forests are already markedly shrinking.

One of the subjects under discussion in the literature of the subject is the composition of virgin forests. It is of importance to know if they are composed of a mixture of forest trees of varying age-classes, or whether they are characterised by homogeneity prevailing over large areas.

MÜLLER (Germany) on inspection of the forests of Bulgaria found that the most characteristic feature of the virgin forests consisted in the pure stands and in the homogeneity over large areas. The principal cause of the formation of this homogeneous character he cites as forest fires. The forest fire, which he believes to be a catastrophe recurring every century in primitive forests, causes simultaneous destruction of stands over large areas, where natural regeneration takes place within a short time. He considers however that this regeneration must differ in nature with the different kinds of trees. That of the Scotch pine, according to him, is ensured by sowing by means of the more resistant isolated seed-bearers, or mother-trees, which survive the fire; or in the event of all the trees being burnt, by sowing due to neighbouring forests which have remained immune, and possibly also by a secondary sowing. It is his opinion that soil covered by a layer of ash and charcoal is the most suited for the natural regeneration of Scotch pine. The trunks of spruce, a tree with less abundant resin, will not, he thinks, be entirely consumed by the fire, but only much injured. These trees fall to the ground and rot away, while the seeds that have fallen from the neighbouring mother-trees germinate in the humus which results from the complete decomposition of these trunks. If, in such a case, there are also seed-bearers of Scotch pine in the neighbourhood, this fact will bring about a change in the type of stand; the Scotch pines will occupy the greater part of the surface previously covered with spruce and this latter tree will merely form the undergrowth. MÜLLER is of opinion that the regeneration of the resinous shade-tree — the spruce and the pine — is effected by means of the intermediary growths that allow the passage of light, such as birch, aspen, willow, white alder, hazel and broom. The resinous shade trees grow first under the shelter of these and then come to be the dominating kinds. The reason for the uniformity of great stands of broad-leaved shade trees, such as beech, is to be found, according to him, not so much in the fires as in the damage caused by the hurricanes which have overthrown the trees.

As regards the spontaneous changing of the kinds of trees in virgin forests, MÜLLER regards it as a movement of secular rotation due primarily to the recurring fires, so that the prevalence of the kinds allowing passage of light over shade or part shade trees forms only one period of this rotation.

These conclusions, first deduced from a study of Bulgarian forests have been

generalised by MÜLLER who considers that they are equally of application, up to a certain point at least, to the greater number of the virgin forests of Europe and North America.

The greater part of the literature relating to the subject seems to voice an opinion opposed to that of MÜLLER and to his deductions. RUBNER and HESMER (Germany) criticise the conclusions of MÜLLER and throw doubt upon the correctness of almost all his statements. They consider that MÜLLER ascribes too great an importance to forest fires as a factor in the regeneration and general life of virgin forests. RUBNER and other writers show that it is the natural death of the trees, the uprooting of isolated trees by wind, and in a degree quite subordinate, soil fire, which have the real importance in the regeneration of the virgin forests of Northern Europe, as being the factors bringing about group regeneration, the most general type of regeneration in Northern Europe. RUBNER disputes the theory that soil covered with ash and charcoal is more suited to the natural re-sowing of Scotch pine than soil covered with a sand dune vegetation. The spruce by no means always needs humus due to the decomposition of tree trunks for its germination.

HESMER contradicts the statement of MÜLLER that forest fires are a catastrophe recurring every century in the virgin forests of Northern Europe. He shows that the forest fire only recurs once in the course of several centuries, so that it can have no further influence of importance on the composition of virgin forests and can in no way be the main cause of the natural change in the kinds of trees.

RUBNER and HESMER also dispute the statement that the stands of virgin forests are characterised by their homogeneity over large areas. Their conclusion, based on the observation of composition of virgin forests, which usually show a great mixture of kinds of trees, is that the Bulgarian forests studied by MÜLLER had already lost their primitive character in consequence of the intervention of man, *e. g.* fires, grazing, and hence the conclusions reached in regard to these forests cannot be in any way generalised for all the virgin forests.

FRÖHLICH (Rumania), in his study of the virgin forests of South Eastern Europe, IWASCHKEWITSCH (U. S. S. R.) who has investigated those of Eastern Russia and MARKGRAF (Germany) who studied those of Albania, have found that the most important characteristics of the virgin forests are : 1. diversity and inequality of the size, the height and the cubic contents of the trees — 2. the mixture of trees 3. their difference in age. Even if, at the first glance, the virgin forests seem homogeneous, on attentive examination it will be seen that this is not the case.

FRÖHLICH compares them with cut-over forests, but he insists on the essential differences between the two forms of forest. The age-classes are very unequally represented in the primitive forests; there are always two or three classes that do not appear. As the main difference he instances the fact that while the interruption of the leaf canopy caused by the intervention of man is nearly always visible in the cut-over forests, in the virgin forests, on the other hand, this canopy is nearly always complete, any interruption being merely an exception of a passing order due to the fall of a giant trunk. Inequality of trunks in size and height is however much more marked in the virgin than in the cut-over forests. It is thus, according to FRÖHLICH also, inequality which is a prevailing feature in virgin forests, on the other hand, equality, as found by MARKGRAF also is only an exception due to great catastrophes, fires, hurricanes, etc.

As regards the life, the method of regeneration and the increment of virgin forests, very important conclusions may be drawn from an examination of the annual rings of the trunks. DENGLE (Germany) shows that the trunks of the undergrowth

inevitably undergo choking by vertical shade from the dominating trees over many decades and often even for a century. No forest organiser intervenes to cut down the mature trees nor even to give the young thicket a chance to grow by making clearings. After the death of a gigantic trunk, room is naturally given to the crowns of a large number of trunks and those that can best utilise the opportunity may become giant trees. The annual rings show that the giant trunk was often only from 10 to 15 cm. in diameter at the age of 100 years, while at the age of from 250 to 300 years it may exceed a metre. FRÖHLICH has found on the same tree that the annual rings of the first 80 to 100 years were scarcely to be made out by the naked eye, while those representing the years from 100 to 150 were from 5 to 7 mm. thick. IWASCHKEWITSCH mentions that frequently quite young trunks are found in virgin forests with larger diameters than older trunks, but he notes a certain regularity and some direct relations between age classes and size categories.

As regards the height of the trees, which also varies considerably in virgin forests, the majority of the writers agree in recognising that it is not any more than the diameter in direct relation with age and that height varies much more in virgin forests than in cut-over forests.

All writers, except MÜLLER, admit that there is a very great variety among the kinds of trees. FRÖHLICH also has observed pure stands of virgin forests, especially beech, spruce and pine, and also mentions a fact of great importance from the silvicultural point of view, *viz.* that the soils of these pure stands, in the primitive forests, have not deteriorated during the centuries; the true virgin forest, however, is usually characterised by a great variety of trees, which grew intermingled with no grouping or regularity of any kind. This is noticeable in the virgin forests of the Carpathians and the Balkans, and to a much greater extent in those of Eastern Russia and of Asia: in Manchuria, for example, a mixture of 150 different kinds of trees is found (IWASCHKEWITSCH).

The density of virgin forests also varies considerably, but slowly; the centuries old trunks of the great trees die of old age as they stand or are blown down by storms and decay on the soil of the forest. The passage of time does not affect greatly the composition of the virgin forests.

Great changes however may be suddenly brought about by the intervention of man. The destruction of stands by fire or by grazing animals is usually followed by their transformation into fields of small value. The trees establishing themselves after a forest fire are not as a rule of the same kind as those that were there before. There is a danger of the disappearance of the valuable timbers and certain of these which are not found in other countries ought to be preserved for the coming generation.

It is well known that virgin forests contain immense forest resources, but a great quantity of this wealth is lost each year. In the virgin forests of the Caucasus, for example, it would be possible to fell 20 million cubic metres of valuable timbers, but because of their inaccessibility, not even half is exploited. As an instance of the technical value of the timber so lost, the Caucasus oak may be mentioned, the resistance of which is 1000 kg. per sq. cm., while that of the other oaks does not exceed 600 kg. per sq. cm. Out of the 80 million hectares of forests of Eastern Russia, 30 million hectares are still intact, in consequence of their remote situation and the absence of communications; of the remaining area, sixty per cent. only is worked under a scheme of forest working.

A regular working of these forests according to management schemes would be profitable and is called for. The objectives of forestry research are thus: 1. to endeavour to become acquainted with the age-relations in these forests — 2. to

prepare growth tables — 3. to establish volumetric tables — 4. to prepare tables for the estimation of growing stock — all in view of an application to the stands of virgin forests.

The transformation of virgin forest into utilisation forests has already been undertaken in some regions; FRÖHLICH proposes certain methods for this process. As however the life of forests differs according to their stands and the trees composing them, according to climate, soil, etc., the process of conversion of these forests is also very different. The choice of the best methods depends on a full knowledge of the life and all conditions of the forests in question.

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G. LUNCZ.

Notes.

RESOLUTION OF THE IMPERIAL CONFERENCE IN REGARD TO FORESTRY. — In pursuance of a decision taken at the opening meeting of the Imperial Conference on October 1930, a Committee was set up to consider Forestry questions and to report to the Conference thereon. This Committee was composed of delegates with special knowledge of forestry in the United Kingdom, the Irish Free State, the Dominions, Colonies and Protectorates of the British Empire, the chairman being Sir Padamiji P. Ginwala (India).

This Committee held seven meetings and gave detailed consideration to important forestry problems of the Empire and proposed the following resolution which was subsequently adopted by the Imperial Conference:—

"The Conference:

- (1) urges all the Governments concerned to develop such forest policies as will bring their forests under effective management;
- (2) takes favourable note of the good beginning which has been made in various parts of the Commonwealth in forest products research, and of the steps which are being taken by the Empire Marketing Board and the Forest Products Research Laboratory at Princes Risborough to promote the utilisation of Empire timbers; and expresses the opinion that the scope of forest research should be widened to include the utilisation of exotic as well as indigenous timbers;
- (3) recognises the value of the Imperial Forestry Institute and the desirability of attaching to it a *Bureau for the collection and dissemination of information*, and further recommends the several Governments to give these bodies their fullest support;
- (4) desires to place on record its appreciation of the munificent gift of £ 25,000 by His Highness the Rajah of Sarawak to the Imperial Forestry Institute;
- (5) desires to express its appreciation of the excellent work done by the Empire Forestry Conferences, welcomes the invitation of His Majesty's Government in the Union of South Africa to hold the next Conference in that Dominion in 1933, and recommends to all the Governments concerned active preparation for and participation in that Conference". (*Empire Forestry Journal*, Vol. 9, No. 2, London, 1930).

WORLD RESOURCES OF TIMBER. — The fact that everywhere, with the growth of population, the forest areas are diminishing, and that it is the countries and regions that are most densely peopled that have the lowest proportion of forest area, is shown by the figures of M. Th. I. STREYFFERT in two articles published in the periodicals *Svenska Skogsvårdsföreningens Tidskrift* (Stockholm 1930, Haft IV) and *Skogen* (Stockholm 1931, No. 2).

In the course of past centuries the bulk of the original forest area of Europe has been turned into arable land or — to a less extent — into waste land. This process has advanced furthest in the Mediterranean region and in western Europe, where the forest land only occupies 5 to 20 % of the total area. In central Europe this percentage rises to from 25-40 %, and in northern Europe to from 50-65 %. (For northern Europe and northern Russia the proportions include considerable areas of brush-wood, etc.).

It is of paramount interest to know whether in the forests of Europe the cut exceeds the growth or not. As the home consumption of softwood timber has been ascertained in all countries it is easy to compute the cut of softwood timber, where this has not already been done, by adding the surplus of exports or deducting the surplus of imports. Difficulty arises in the determination of the rate of growth which can be stated exactly only for the Scandinavian countries and Finland. As regards the remaining countries the problem has been solved in different ways. The author considers that the cut in Germany, where the principle of sustained yield has perhaps gained a stronger hold than elsewhere, may be taken as the basis from which to judge the possible sustained yield of the other central European countries. As the cut of softwood timber (including pit props and pulp wood) on the basis of the census made in 1913 and 1927 was found to be 2.4 m³ per hectare in Germany, the possible sustained yield of softwood timber in most other central Europe countries has been assumed to be somewhat lower, 2.0 m³ per hectare. For Czechoslovakia and Austria official figures indicate a growth of respectively 2.6 and 2.1 m³ of softwood timber, figures it seems reasonable to apply to the possible sustained yield of these countries. As regards Russia, it has been estimated at 0.6 m³ per hectare on the basis of the sustained yield of Sweden and Finland, viz. 1.4 and 1.0 m³ of softwood timber. All figures are computed without bark and exclusive of fuel wood.

Summarising the author obtains for growth and cut of softwood timber, a possible sustained yield of about 185 million m³ for Europe as a whole. The average cut for Europe was for the years 1925 to 1927, about 177 million m³; but the excess growth shown by these figures does not in reality exist, since 27 of these 185 million m³ refer to Russia, where the excess growth over cut is most probably lost through decay in the forests. The real situation for Europe, apart from Russia, in these years, involves a net balance of about 19 million m³ of cut over growth. In the years 1928 and 1929 this balance may be estimated as having increased to 24 and 22 million m³, judged from an analysis of the exports and imports of softwood products of the European countries.

The question put in the second of the articles is "How does the world stand in relation to this shortage of forests?". After a review of the numerous and complex factors which have a bearing on this problem, the writer replies by relatively reassuring conclusions. These he bases, *inter alia*, on the fact that even if the consumption of pulp wood is increasing in the world, the consumption of softwood construction timber is slowly decreasing, a decrease which is possibly due to the growing substitution of construction timber by other materials (cement, steel, etc.). Speaking of North America, the writer says that the annual average total of sawn timber exported or imported by Canada and the United States was 22.8 million of standards (1) from 1908 to 1912, and only 18.7 million standards from 1922 to 1926. Thus in the space of 14 years the consumption of sawn timber declined by 4.1 million standards, or 18 %.

Re-examining the conditions in different parts of the world, the writer states the world consumption of construction timber is shrinking by about one million cubic metres per year: this figure is however perhaps rather too low. To the decrease indicated above in the consumption of sawn wood, there corresponds an annual decline in the consumption of wooden commodities equal to about three million m³, while the consumption of wood pulp shows an increase of two million m³ per year. The decrease in consumption of wooden commodities is thus about 0.7 % and the increase in that of wood pulp is 3.2 %.

(1) A standard, 4,672 m³.

While in the former of the two articles, the writer shows how in Europe the exploitation exceeds the growth, in the second he shows that exploitation in North America also considerably exceeds growth. According to the official figures, towards 1920, a woody volume four times greater than the woody increment was consumed in the soft-wood forests of the United States by cutting and by forest fires. In Canada, it seems also that the woody volume consumed by fellings, forest fires, etc. exceeds that of the growth to a quite considerable extent. Even over the great areas of coniferous forests in Northern Asia, a woody volume superior to that of the growth seems to be consumed by fellings and fires.

If however it seems possible to affirm that the exploitation and destruction of forests exceeds the growth in the greater part of the world, the writer stresses as an important factor, modifying the effect of these conditions, the fact that growth is increasing over vast areas. This is due to the fact that : 1. virgin forests without defined increment have been, in many parts, replaced by forests giving a controlled increment; 2. considerable attention including regeneration, preservation, protection against forest fires, is now given to the forests.

R. W.

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MONTHLY BULLETIN

OF

AGRICULTURAL SCIENCE AND PRACTICE

GENERAL AGRONOMY

Production and Utilisation of Pears in the United States.

Pears are not grown to such a large extent as apples in the United States because in most regions the climate is not suitable, there being too great variation in weather conditions. The industry has however developed enormously during the last 20 years in California, which now supplies 30 % of the total production of the country. One of the chief difficulties in the way of pear growing in the north-west is the blight caused by *Bacillus amylovorus*. 'This has killed a great number of trees during the last 10 years.

The total pear production is about 27 million bushels, $\frac{2}{3}$ of which come from the Pacific coast. Over 2 million bushels of fresh pears and 2 million bushels of canned pears are exported to Canada, England and Central and South America.

The principal pear growing regions are the western States of California, Washington, Oregon and Colorado and the eastern States of New York, Michigan, Illinois, Missouri and New Jersey, but within these States the industry is localised mainly in the Hudson river valley, the region of the Great Lakes, the New York district, south-west Michigan, central California, the Rogue valley (Oregon) and the Yaquina valley (Washington State).

For some years New York was the leading pear producing State, but of recent years California has obtained the supremacy. The California industry is typical of that throughout the west, where everything possible in the way of varietal selection, irrigation, protection against frost and disease, etc. is done to obtain maximum production. Department of Agriculture experts state that the annual production of the three Pacific Coast States will shortly reach 18 million bushels.

Sixty per cent of the total area under pears is in California, New York, Washington and Oregon, which supply about 70 % of the total production, about 86 % of the exported pears and 90 % of the canned and dried pears.

The orchards of the north-west have a lower yield than those of the Pacific Coast and ripen later. In the north-west Bartlett pears give an average crop of 140 to 160 bushels to the acre, Kieffer 200 and Seckel 125. In California the commercial production of Bartlett pears began 6 or 7 years ago and for 12 years the average crop has been from 6 to 7.5 tons or 240 to 300 boxes of fruit per acre. In the Santa Clara valley there are plantations of Beurré Hardy 50 years old yielding an average of 2,800 boxes to the acre, which is a truly exceptional production. The oldest orchards are those in the Hudson valley which have been established for 200 years.

Planting systems (see Table II) vary in the different regions according to the varieties and methods of pruning and training.

TABLE I. — *Pear production in the different States.*

State	Total no. of trees (including those not yet in bearing) 1910	Total no. of trees (including those not yet in bearing) 1929	Production in bushels	Principal varieties grown	Percentage acreage under these varieties as compared with other varieties
California	1 808 998	8 780 550	8 950 000	Bartlett	85
New York	3 644 250	3 560 430	2 880 500	"	50-60
Washington	908 430	1 750 000	3 252 000	"	70
Oregon	1 070 210	1 495 830	1 985 650	"	40-50
Michigan	1 760 032	1 350 225	1 340 000	Kieffer	60
Pennsylvania	1 179 060	875 450	755 320	Bartlett	55
Illinois	1 020 380	750 810	688 435	Kieffer	83
Ohio	1 232 760	720 430	405 250	"	40
Texas	1 007 380	695 900	876 490	Bartlett	50
Missouri	879 190	480 350	475 250	Kieffer	45
New Jersey	970 000	475 600	675 000	"	60
Colorado	271 360	215 000	868 480	"	50
Delaware	540 610	210 500	380 000	"	90
Other States	7 272 290	3 318 845	2 544 625	"	—
Total	23 565 000	24 630 000	26 000 000	—	—

Although 5000 varieties of pears are known only 55 are now grown on a large scale. In the United States the Bartlett and Kieffer varieties form the bulk of the pears grown. The former will thrive in varied conditions of climate, soil and situation and the fruit is satisfactory as regards size but is not of the best quality. It is well adapted for storage and transport.

In the commercial pear growing districts of the West great importance is attached to the exact moment for picking; the fruit must be of the right colour, consistency, sugar and acid content, etc. If pears are picked too green not only are they sour and lacking in flavour but they split and deteriorate readily. In general when a pear loses its 'grass green' colour it is ready for picking. The mechanical pressure tester already described for apples (see this *Bulletin* — 1931, no. 5, pp. 162, 163) is used throughout the West for pears. The chief rules to be observed in using the pressure tester are the following: — when the piston is introduced to a depth of $\frac{5}{16}$ inch the scale must register 16 to 21 lbs for Bartlett pears for storage, or 15 to 18 lbs for immediate consumption or canning; and, for storage purposes, 13 to 16 lbs for Bosc pears, 12 to 16 for Anjou, 10 to 13 for Comice, 12 to 16 for Win-

TABLE II. — *Planting systems in pear orchards.*

Planting distance in the rows (in feet)	Distance between rows (in feet)	Number of trees per acre	Type of growth
10	10	485	Dwarf
12	12	302	
12	16	* 226	
14	14	222	
15	15	193	
16	16	170	Vigorous
18	18	134	
20	20	* 106	
25	25	* 69	
			Very vigorous

* Standard number of trees of each type.

TABLE III. — *Characteristics of the main commercial varieties of pears.*

Varieties	Dimensions of fruit		Time of ripening	Colour	Observation
	Length in inches	Diameter in inches			
Bartlett	3 ¹ / ₈	2 ¹ / ₈	September	Bright yellow and pink	Hardy
Kieffer	3 ¹ / ₈	2 ³ / ₈	Oct.-Nov.	Yellow and deep red	Disease resistant
Seckel	2 ¹ / ₈	2	October	Pinkish yellow	"
Clapp Favorite	3	3 ¹ / ₈	Aug.-Sep.	Pale pinkish lemon	—
Beurré d'Anjou	3 ¹ / ₂	1 ¹ / ₂	Nov.-Dec.	Yellow streaked with pink	Hardy
Beurré Clairgeau	3 ¹ / ₈	2 ¹ / ₈	Oct.-Nov.	Yellow and red	—
Winter Nelis	2 ¹ / ₈	2 ¹ / ₈	Dec.-Jan.	Greenish yellow	Hardy
Flemish Beauty	2 ¹ / ₈	2 ¹ / ₂	Sep.-Oct.	Bright yellow tinged with red	"
Doyenné du Comice	3	2 ¹ / ₈	Oct.-Nov.	Bright yellow	—
Howell	2 ¹ / ₈	2 ¹ / ₈	Sept.-Oct.	Lemon and pale green	—
Duchesse d'Angoulême	4	3	Oct.-Nov.	Pinkish yellow	Disease resistant
Tyson	2 ¹ / ₈	1 ¹ / ₈	August	Deep yellow	"
Beurré Bosc	3 ¹ / ₈	2 ¹ / ₈	Oct.-Nov.	Deep pink	Good garden variety
Lawrence	2 ¹ / ₈	2 ¹ / ₈	Nov.-Dec.	Lemon yellow	Hardy
Blood Good	2 ¹ / ₈	2	August	Pinkish yellow	Garden variety
Sheldon	2 ¹ / ₈	2 ¹ / ₂	October	Deep yellow	Hardy
Passe Colmar	2 ¹ / ₂	2 ¹ / ₈	Dec.-Jan.	Yellowish green	—
Belle Lucrative	2 ¹ / ₈	2 ¹ / ₈	Sept.-Oct.	Green and pinkish yellow	—
Darra Hovey	2 ¹ / ₂	2 ¹ / ₈	Oct.-Nov.	Golden yellow	Orchard variety
Le Comte	3 ¹ / ₁₆	2 ¹ / ₈	Oct.-Nov.	Pale pinkish yellow	Disease resistant
Beurré Hardy	3	2 ¹ / ₈	Sept.-Oct.	Green and red	—
Elizabeth	2 ¹ / ₈	2 ¹ / ₂	August	Yellow and pink	Disease resistant
Doyenné Boussock	3	2 ¹ / ₈	September	Pale yellow and red	"
Idaho	2	2 ¹ / ₈	Sept.-Oct.	Bright pinkish yellow	—
Sudduth	2 ¹ / ₈	2 ¹ / ₈	Sept.-Oct.	Dark green	Disease resistant
Wilder Early	2 ¹ / ₈	2 ¹ / ₈	August	Pale lemon yellow	"

ter Nelis, 9 to 11 for Hardy. For immediate consumption or canning the pressure may read a little lower.

Of recent years great progress has been achieved in the United States in the standardisation of agricultural produce for facilitating marketing. Upwards of 50 different fruits and vegetables are now standardised with regard to size, colour, deformity or damage due to diseases, pests or accidental injury. Standardisation of quality must be adaptable to the purchaser's purposes; for example, a pear of medium size but good colour is more in demand for dessert purposes than a large pear of the same variety lacking colour; for the canning industry, on the other hand, size is more important than colour, for the cost of peeling must be taken into account; for cider or vinegar manufacture no importance is attached to size or colour. The work of standardisation is carried out by Department of Agriculture specialists who have devoted years to a study of market requirements.

The standard grades for pears are — Extra Fancy — U. S. No. 1 — U. S. No. 2 — U. S. Combination Grade — Unclassified.

Extra Fancy. — This grade includes only fruit of a single variety, uniform in size, well-shaped, firm, ripe, clean and free from blemishes.

U. S. No. 1. — Pears of a single variety, ripe, clean, well-shaped, free from rot, insect damage, skin cuts or injury due to bruising, scorching, hail, drought, disease, etc. No more than 10 % of the fruit may fall short of these requirements and no more than 5 % may have defects which seriously spoil the appearance of the whole.

U. S. No. 2. — Same requirements as for the preceding grade with the exception that the fruit need not be well-shaped.

U. S. Combination Grade. — When the grades U. S. No. 1 and U. S. No. 2

are packed together the box must bear the label "Combination Grade No. 1 and No. 2". At least 25 % of the fruit must fulfil the requirements for No. 1 grade.

Unclassified. — This grade includes any pears not fulfilling the requirements of the other grades.

The size of the fruits must be stated on the outside of the box and at least 5 % of the contents must be above a specified minimum size.

Pears are packed in the bushel barrel, the standard box and half-box and the half-barrel. The barrel is too large for this type of fruit but is used to some extent in the Northwest. The half-barrel and bushel basket are used by preference in the eastern States and the standard box and half-box in the west. The inside measurements of the standard box are:— 18 in. long, 11.5 in. wide and 8.5 in. deep, i. e., a little smaller than the standard box for apples. The minimum weight of a box is 45 lbs., but the weight is generally 50 lbs. Each fruit is wrapped in paper and packed so that no shifting can occur in transport. A space of 1 inch must be left between the last layer of fruits and the lid. In Washington State the box measures 18 × 11.5 × 8 inches. The standard half-box measures, inside, 18 × 11.5 × 4.5 inches or 18 × 11.5 × 5 inches. The latter size is used mainly for peaches but in certain districts is used also for pears. The half-barrel measures 18 inches in length and 12.5 inches in diameter; its maximum circumference is 50 inches and there are 16.5 inches between the bottom and the lid. The bushel basket is round and is used mainly for local marketing. The barrel is of the same size as that used for apples.

TABLE IV. — *Methods of packing pears.*

Size of fruits in inches	Number of fruits	Numbers of layers	Packing
3 3/4 — 3 3/8	80	4	4 layers of 20 fruits
3 3/8 — 3 3/4	90	4	layers 1 and 3 of 23 fruits; 2 and 4 of 22
3 — 3 3/8	100	4	4 layers of 25 fruits
2 7/8 — 3	110	4	layers 1 and 3 of 28 fruits; 2 and 4 of 27
2 3/4 — 2 7/8	120	4	4 layers of 30 fruits
2 3/8 — 2 3/4	135	5	5 " " 27 "
2 1/2 — 2 3/4	150	5	5 " " 30 "
2 3/8 — 2 1/2	165	5	5 " " 33 "
2 1/4 — 2 3/8	180	5	5 " " 36 "
2 — 2 1/4	216	6	6 " " 36 "

Grading machines have not proved as successful with pears as with other fruits. The reasons of this are the special shape of the fruit and the differences between varieties. The machines actually in use grade by weight.

The Bartlett, Kieffer and other standard varieties keep well in cold storage if they are carefully picked. Bartlett pears require a storage temperature of from — 2.2° to — 1.1°C, Kieffer and Bosc pears between — 1.1° and 0°C. Fruit gathered in good condition will keep for several months.

Cold storage makes possible a satisfactory distribution of the fruit to the markets and prevents a glut during the season of greatest production. Transport has to be effected in refrigerator cars except for the late varieties. About 20,000 car-loads, representing approximately 10 million bushels of fruit, are consigned annually from the producing centres to the centres of consumption; 95 % of this traffic takes place between August and October inclusive.

The pear canning industry is almost exclusively confined to the Pacific Coast States. About 4 million boxes of pears, with a value of 20 million dollars, are canned

annually. The Pacific Coast supplies 90 %, of which 60 % come from California. About 2 million tins are exported : 80 % to England and the rest to Canada and Cuba. The canning industry has developed particularly in the fruit growing districts which are at a distance from large centres of consumption. Large fruits with a minimum diameter of 2.5 in. are preferred for this purpose. The Bartlett, Beurré Bosc and Clapp's Favourite varieties are most used.

Pears are also dried in the Pacific Coast States, chiefly in California. Over 4000 tons (160,000 boxes) of fruit are used in this way. Pears for drying are gathered before they are completely ripe and then are left for 8 to 10 days on boards to finish ripening. When ripe they are sliced in half, cored and exposed to the sun on boards 8 ft. by 3 ft.* The dried fruit is bleached with sulphur dioxide.

The future development of pear growing depends in the first place on obtaining good commercial varieties which are disease resistant. It is essential to make a careful study of the methods of production, cultivation, harvesting, marketing, disease and pest control, prevention of deterioration during transport and in the market, the economics of production, etc. In California, which is the chief pear growing region, new orchards of good varieties are being established in the sections best adapted to pears and it is hoped to reduce production costs. There are also 20,000 acres of pear orchards not yet in bearing and there is keen competition between pears and several other fruits whose cultivation has rapidly developed of recent years. Growers, commercial organisations, banks, transport companies, etc. should collaborate in bringing about a gradual development of exportation and an increase in consumption, specially of late varieties, on the world markets.

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Notes.

I. GENERAL AGRONOMY.

Meteorology.

IVTH GENERAL ASSEMBLY OF THE INTERNATIONAL UNION OF GEODESY AND GEOPHYSICS (STOCKHOLM 1930): ACTIVITIES OF THE METEOROLOGICAL SECTION. — The following are the more important of the discussions and resolutions of the Section.

(1) Prof. Filippo EREDIA who was requested by the Prague Assembly to undertake a study of the meteorological data essential for the synthetic characterisation of the climate of a given locality expressed his views on the subject but suggested that the question should be entrusted to the International Climatological Commission of the O. M. I. (International Meteorological Organisation) as most competent for its study. The proposal was adopted.

(2) The report of Prof. HANZLIK on the measurement of rainfall and certain proposals of the United States National Research Council determined the Section to report to the O. M. I. on the necessity for a standardisation of instruments and methods for rainfall measurement.

(3) In view of the urgent importance of a study of atmospheric ozone the Section approved the formation of a Sub-Commission of the Solar Radiation Commission for its investigation.

(4) The Section took note of the formation of a Central Actinometric Institute at Tropau, Czechoslovakia, and approved the programme for a bibliography of literature on solar radiation, which will undoubtedly be of great service.

METEOROLOGICAL STATION ON MOUNT ELBROUZ, CAUCASUS. — A small station was installed in February 1931 by a group of Russian scientists on the summit of this mountain at an altitude of 5632 metres. (*La Meteorologia pratica*, Montecassino 1931, N. 1, p. 43).

INTERNATIONAL METEOROLOGICAL EXPEDITION TO THE ANTARCTIC. — This expedition is planned to carry out meteorological, electric and magnetic research in Little America over a whole year. It is expected that 27 nations will take part. The United States proposes to participate and contribute 30,000 dollars. (*La Meteorologia pratica*, Montecassino 1931, N. 1, p. 43).

T. B.

Soil Science.

NEW DETERMINATIONS OF THE WILTING COEFFICIENT. — When the soil moisture content is reduced below a certain minimum it is no longer available to plants and they begin to wilt. This minimum content, known as the wilting coefficient, varies with the type of soil but little with different crop plants; so that it can be determined indirectly by means of a formula such as that established by BRIGGS and SHANTZ (1912), viz,

$$\text{Wilting coefficient} = \frac{\text{Hygroscopic coefficient}}{0.68 \pm 0.012}$$

The subject has recently been taken up again by CAPALUNGAN and MURPHY using a number of Oklahoma soils and the principal crops common to them all. The formula obtained differed little from that of BRIGGS and SHANTZ, viz.

$$\text{Wilting coefficient} = \frac{\text{Hygroscopic coefficient}}{0.61 \pm 0.014}$$

(*Journal of the American Society of Agronomy*, Geneva N. Y., 1930, vol. 22, No. 10 pp. 842-847).

RESEARCH ON THE CONTENT IN LIME AND FERTILISER PRINCIPLES OF HUNGARIAN SOILS. — A study was carried out at the Institute of Agricultural Chemistry of Budapest University by G. DOBY, J. CSIKY and F. SNASSEL, on the arable layer of 834 soil profiles from various parts of the country. Determinations were made of the % of lime, the pH, the % of nitrogen, the % of phosphoric acid and of potash by the NEUBAUER method. The following results were obtained :—

(1) In about 7 % of the soils studied the content in CaCO_3 is above 12 % ; in about 34 % it is between 12 and 1 % ; in the others (about 58 %) it is between 1 and 0 %.

(2) Without being definitely acid a great part of the soils studied have however a tendency to acidity which necessitates the application of lime.

(3) Most of the soils studied required phosphates.

(4) Most of them also required greater or lesser dressings of nitrogenous and potassic fertilisers.

(5) In most soils there is thus a deficiency in more than one fertilising element.

(6) These results show the need for a more thorough study of Hungarian soils, of carrying out field manuring trials and applying chemical fertilisers more widely. (*Mezőgazdasági Kutatások* (Agricultural Research) Budapest 1930, No. 12, p. 497-505).

THE DETERMINATION OF THE READILY AVAILABLE PHOSPHORUS OF SOILS. — A method is proposed by TRUOG in which a 0.002 normal solution of sulphuric acid, buffered with ammonium sulphate to a pH of 3, is used in the proportion of 200 parts of solvent to 1 of soil to extract the readily available phosphorus of the soil. The soil is agitated in contact with the solvent for 30 minutes. The phosphorus is then determined directly in the filtered extract by means of the DENIGES colorimetric method.

The method is rapid and the writer states that it has given satisfactory results in hundreds of tests during the past several years. (*Ibid.*, pp. 874-882).

THE INFLUENCE OF COMBINED NITROGEN ON GROWTH AND NITROGEN FIXATION BY AZOTOBACTER. — As a result of a study of this important question FULLER and RETTGER have reached the following conclusions :—

Azotobacter is able to fix substantial quantities of free atmospheric nitrogen when

cultivated in a medium which is free from combined nitrogen and in an atmosphere which is free from ammonia and nitrous acid.

Azotobacter will utilise available combined nitrogen instead of fixing free nitrogen, but differences in behaviour are noticeable with different forms of combined nitrogen. Thus highly complex organic nitrogenous compounds (except peptone) do not seem to be actively utilised by *Azotobacter*, having little effect on growth or nitrogen fixation. (Pepton increased growth but reduced nitrogen fixation). Less complex organic nitrogenous compounds, on the other hand, and inorganic compounds (ammonium salts) seem to be readily utilised, increasing growth and decreasing nitrogen fixation.

These facts show that when *Azotobacter* finds available combined nitrogen it will utilise it instead of following the more laborious process of fixing free nitrogen. (*Soil Science*, Baltimore 1931, vol. 31, no. 3, pp. 219-234).

T. B.

Soil Improvement.

INCREASED USE OF CHEMICAL FERTILISERS IN EGYPT. — The increase continues steadily as a result of the activities of the Ministry of Agriculture, the Royal Agricultural Society and the agents of foreign producers. Egyptian farmers now realise the need for chemical fertilisers to increase the output from the soil and for intensive cultivation. The alluvial soils of Egypt being relatively poor in nitrogen and in phosphorus the demand is chiefly for sodium nitrate and superphosphates. Much calcium nitrate is also used and a certain quantity of ammonium sulphate.

The following factors tend to intensify the use of chemical fertilisers:—(1) the ever increasing acreage of cultivated land since the Government has undertaken irrigation works; (2) the increasing wealth of the peasant classes; (3) the dividing up of the large estates; (4) the gradual reduction of livestock and the consequent scarcity of organic manures.

Egyptian production of fertilisers for home consumption. — This is not of any great extent. Nitrate schist ('tafla') is obtained in Upper Egypt and is utilised just as it is on the spot. Two companies exploit the large beds of phosphates between Kosseir and Sebaia, but export the whole of the product, mainly to Japan and Italy. At Suez a small factory manufactures low quality superphosphates.

Imports. — The import of Chili saltpetre — the fertiliser most used — began 30 years ago and rapidly increased until in 1929 it had become about 3 times as great as that of other nitrogenous fertilisers and 50 % of the total imports of fertilisers.

German calcium nitrate is the most serious rival of saltpetre and in 1928 supplanted the Norwegian calcium nitrate owing to its higher nitrogen content. English 'nitro-chalk' and French calcium nitrate have also appeared on the market, the latter in considerable quantities.

Since 1925 the importation of ammonium sulphate has greatly diminished.

Calcium cyanamide has not been very successful in spite of its low price.

Although the use of sulphonitrate of ammonia increased considerably in 1929 compound fertilisers are still little known and are not expected to increase in the near future.

The importation of superphosphates on the other hand will probably continue increasing because Egyptian soils are for the most part alkaline. They are applied principally to leguminous vegetable (beans, peas, lentils, etc.) and to cotton.

Potassic fertilisers, which are still little used, are supplied by the Franco-German Syndicate.

The following table gives a summary of the imports and exports of fertilisers (in tons) from 1926 to 1929.

	1926	1927	1928	1929
<i>Imports :</i>				
Sodium nitrate	172 849	142 299	188 077	193 125
Calcium nitrate	25 230	33 510	39 876	64 795
Ammonium sulfate	3 453	2 052	4 480	2 500
sulphonitrate	—	1 048	555	3 481
Calcium cyanamide	1 281	1 406	2 093	1 662
Superphosphates	36 791	43 833	39 236	60 532
Various fertilisers	3 463	375	1 013	1 678
TOTAL . . .	243 073	225 430	275 370	327 863
<i>Exports :</i>				
Natural phosphates	176 123	274 326	168 792	216 571

Future prospects. — The fact that Egyptian growers want quick acting fertilisers favours nitrogenous fertilisers at the expense of phosphates. The advantages of the latter must therefore be demonstrated in order to develop the market for them.

On the other hand, increased acreage under cultivation and increased use of chemical fertilisers are making it necessary to import increasing quantities and it may be expected that in a few years the annual consumption will reach about 400,000 tons of nitrogenous fertilisers and 100,000 to 150,000 tons of superphosphates. (*Le Phosphate et les Engrais chimiques*, Paris 1931, no. 1555, p. 38-39).

POTASH IN ITALIAN TRIPOLITANIA. — In the region of Zuara over an area of about 50 sq. km. there are salt beds (NaCl) containing a certain amount of potash. A factory has been set up to extract it by the process of Dr. NICCOLI (*Giornale di Chimica industriale*, Milan, 1925, p. 187), utilising solar heat for the concentration and allowing of the production of a 92-94 % pure potassium sulphate and a very pure magnesium sulphate, which is utilisable in the artificial silk industry. (*L'Engrais*, Paris, 1930, no. 16, pp. 495 and 497).

SOIL LIMING : SLAKING BEFORE SPREADING. — Interesting experiments on liming with slaked lime have been carried out by M. ANDOUARD, Director of the Agronomic Station at Nantes (France). His chief results were the following :—

Slaking may be done in 2 ways: (1) the quick lime is left in heaps on the fields to become hydrated in the open air, then when well slaked is spread and then incorporated in the soil; (2) the heaps are covered with a thin layer of soil and allowed to slake thus until ready for spreading.

The time taken in slaking depends on the moisture of the air as well as on whether or not the heaps are covered. But it is important to know the conditions which favour hydration while reducing carbonatation to a minimum. These experiments showed that :—

(1) In small exposed heaps lime is carbonised more in damp than in relatively dry weather but even in unfavourable conditions carbonatation does not exceed 14 %.

(2) In small heaps covered with about 3 cm. of soil carbonatation scarcely exceeds 4 % and slaking is only slightly retarded in moist air.

(3) In large exposed heaps the lime slakes more slowly and is carbonised less, carbonatation scarcely reaching 4 % at 10 cm. from the surface.

(4) In large heaps covered with 15 cm. of soil lime slakes slowly and at the end of 3 months has absorbed only 25-28 % of water, but carbonatation does not exceed 3 %. (*L'Engrais*, Paris 1930, No. 20, pp. 635 and 637).

(A propos of lime materials see this *Bulletin*, 1931, No. 4, Notes, p. 124).

T. B.

CROPS OF TEMPERATE REGIONS.

Notes.

General.

AGRICULTURAL RESEARCH IN KANSAS. — The biennial report (Manhattan, 1930) of the Kansas State Agricultural Experiment Station and its branch Stations, for the years 1928 to 1930 contains interesting summaries of the investigations in progress and of the results achieved. The work includes investigations on soil fertility, tillage, plant nutrition and the influence of legumes and free-living micro-organisms on plant growth; breeding experiments for the improvement of varieties of sorghum, wheat, oats and barley; varietal tests of maize, soybeans and forage legumes; pasture improvement investigations; alfalfa investigations in relation to winter hardiness and bacterial wilt; studies of drought resistance of crop plants; investigations of various aspects of orchard and horticultural work; etc.

Co-operation with other Stations has been found increasingly desirable and has been increased.

Land Reclamation.

RECLAMATION OF MUD-FLATS. — The value of *Spartina Townsendii* in the consolidation of tidal mud-flats and in preventing sea erosion has been recognised in England for a number of years. It is of interest to read that experimental planting in New Zealand of the grass in coastal zones very similar to those where it flourishes in Great Britain have proved successful. (ALLAN, *New Zealand Journal of Agriculture*, vol. 40, no. 189, 1930).

Seed Testing.

SEED AND LEGUME INOCULANT INSPECTION IN NEW JERSEY. — The report of the official seed inspection for 1930 gives the results of analyses of 1499 seed samples. Crop, lawn and vegetable seeds of all types used for planting purposes were tested. This careful and thorough inspection is bringing about a reduction in the numbers of cases of intentional violation of the seed law and the quantity of unlabelled seed is also diminishing on the market.

Inspection of the stock of dealers selling legume inoculant cultures was carried out twice in 1930 and showed that while the majority of the samples were satisfactory there were defects in the labelling of the cultures. Some cultures were found not to contain the specific organism for the plants for which they were guaranteed; these were removed from the market by the dealers upon receipt of the laboratory report. (*New Jersey Agricultural Experiment Station Bulletin* 516, 1931).

Root Crops.

TRANSPLANTING SUGAR BEET. — The United States Department of Agriculture has carried out experiments over 4 years in Utah and Idaho to test the practicability of using machine transplanters as a field practice in sugar beet growing. It was found that sugar beet yields can be increased from 1 to 8 tons an acre by proper transplanting methods, while an increase of 2 tons an acre over the yield obtained by standard thinning methods is required to meet the additional cost involved. Transplanted beets were found less susceptible to curly top (caused by *Eutettix tenellus* Baker) and the sugar production per acre was generally in favour of the transplanted beets. It is not recommended that transplanting should supplant present practices, but attention is called to the possibilities of the method. (*U. S. A. Dept. of Agriculture Circ.* No. 156, Washington, 1931).

Horticulture.

HYBRID VIGOUR IN EGG-PLANTS. — The egg-plant (*Solanum Melongena* L.) is one of the most important vegetable crops in Japan and elsewhere. At the Saitama Agricultural Experiment Station, Japan, 341 intervarietal crosses have been tested. It is a well known fact that the cross between varieties of diverse types tends to give a greater degree of vigour, and it was found in the case of egg-plants also that the greatest increases in yield were given by combinations of varieties differing widely from each other. There was a tendency for crosses which gave greater increases in yield to mature earlier, which is a convenient fact for practical utilisation of the first generation hybrid egg-plants.

For practical use in Japan two crosses, Sironasu × Sinkuro and Kintyaku × Sinkuro, were found superior in shape and quality of fruit as well as in yield and time of production. They are now being grown for commercial culture in Japan. (KAKIZAKI, *Genetics*, Brooklyn, 1931, vol. 16, No. 1).

Fruit Growing.

APPLE VARIETIES. — A review of the wholesale market prices obtained for apples in barrels in New York from 1919 to 1928 shows that quality, both in varieties and in grades, of apples is of increasing importance. McIntosh, Albemarle Pippin, Northern Spy, Rhode Island Greening and Delicious sold, on an average, for higher prices than did the other varieties. First-class fruit of inferior varieties fetched lower prices. Thus price trends indicate that the discrimination between good and low quality varieties will increase and that poor varieties should be eliminated as rapidly as possible. (*Cornell University Agricultural Experiment Station Bulletin* 495).

A. M. F.

Review of the most important publications on rubber culture issued in 1930 (I).
(Part I).

Some years ago native rubber came into prominence in an unexpected way and in the present situation of overproduction and low prices it plays an important role. The uncertainty as to its future production makes it important for everyone who is interested in rubber to follow as closely as possible its development and its ups and downs in connection with fluctuations in the price of rubber. This makes the two reports on native rubber in the Netherlands Indies by the Division of Agricultural Economics of the Department of Agriculture especially valuable (1, 2).

TABLE I. — *Exports in tons of 1000 kg.*

	1929	1928	1927
Native rubber in the N. I. } wet	145,477	120,762	152,108
} dry equivalent	108,547 (74.6 %)	91,353 (70.4 %)	100,491 (66%)
Plantation rubber in the N. I.	154,154	140,928	130,895
World production	865,794	656,820	609,106

The export figures in Table I show that the total export of native rubber during 1929 was considerably higher than in 1928 and 1927. The dry-equivalent figures of the three years show that the moisture content of the exported rubber has steadily decreased, which is largely due to the fact that the testing regulations are strictly applied.

While the total export in 1929 was larger than that in 1927 there are some provinces in which a decrease occurred, viz. in Tapanoeli, West Coast of Sumatra and Banka; these are the districts in which the population has also other important means of existence (coffee, coprah, pepper). In the other districts there has been an increase, but one which is much less than the increase in tappable area; the population was obliged to leave many trees untapped, the prices not being high enough

(1) In order to link up this review with the previous one (see this *Bulletin*, 1930, No. 8, pp. 290-299), a few publications issued in 1929 have been inserted.

to make tapping remunerative. As early as April 1930 this fact led to the conclusion that with the low price level of that period there was no reason to expect an increase of native rubber production. On the other hand it was to be expected that a somewhat important increase in price would result in an important increase in production, because a great part of the non-tapped rubber holdings would be taken into exploitation.

This expectation was fulfilled in the following months. While the prices were steadily declining the production of native rubber in 1930 has decreased in comparison with 1929 in spite of an important increase of the number of tappable trees; in the first 8 months of 1929 the total export was 74,729 tons, in that same period in 1930 67,074 tons; this decrease was principally the consequence of the fall in prices of June to August.

A closer observation leads to the conclusion that the decrease of production concerns the larger rubber farms where tapping coolies were employed; the small farms with family tapping are still on the increase, but there are signs that also in these a decrease in production has set in, the farmers again beginning to devote themselves more to the cultivation of food crops. This policy will be readily understood when one realises that, while from January to September prices for 'medium blanket' in Singapore were falling from about 33 cents per $\frac{1}{2}$ kg to about 18 cts, the prices paid on the spot to the farmers in different districts decreased from about 19-11 cts (1) to 6-2 per $\frac{1}{2}$ kg. It is not to be wondered at that the native rubber planter stops tapping when he can get no more than about 4 cts (Dutch) per $\frac{1}{2}$ kg for his rubber.

The year 1929 is the first for which almost complete statistics relating to rubber have been published; these have been made available by the Rubber Statistics Department. GORDON-CARRIE (3) gave some interesting facts, which can be derived from these statistics. A few of these may be mentioned here. It is to be regretted that only graphs are given and no figures, so that the exact areas, yields, etc. can be estimated only approximately from the graphs. Nevertheless these are of interest.

The great extension in the last few years of the area in rubber in Malaya is striking; this amounted for the large estates (of 100 acres and over) in the years 1926, 1927 and 1928 to about 29000, 42000 and 29000 acres, and for the small estates (of less than 100 acres) to about 14000, 15000 and 9000 acres.

Of equal interest are the graphs of production rate of small holdings and large estates, which indicate that the yield per acre on the small holdings is considerably higher than on the large estates (about 500 lbs per month against about 400 lbs per month; exact figures are not given). GORDON-CARRIE points out that the number of trees per acre is far higher in the small holdings; the soil has not been washed away on the small holdings and they use a less conservative tapping system. (TENG-WALL figured out for Java that on most estates the trees are standing wider apart than is advisable for obtaining the highest yield per acre and it may be considered that this is also the case in the F. M. S.

In the opinion of SOUTH (4) cultural methods have been improving on the small holdings. Low prices, however, have caused certain holdings in Selangor to be abandoned.

BOTANICAL INVESTIGATIONS.

The question how deep the cut must be to give the highest yield without disturbing the regular regeneration of the bark is no longer considered urgent, and it

(1) 5 cts (Dutch) is 1 d.

is generally accepted that the tapper finds by practice the right depth. Still BOBILIOFF (5) points out that the anatomical arrangement of latex vessels is quite different in different trees; in some of them the tappable latex vessels are to be found at some distance from the wood, while in others the vessels are already full grown quite near to the wood. For the last mentioned trees a deep cut near to the cambium is necessary to get the maximum amount of latex; the difficulty of getting a good bast regeneration may possibly be overcome by the application of some covering substance. BOBILIOFF emphasises that now it is more than ever necessary to get the highest yield obtainable from the trees and it is therefore advisable to study more carefully in every tree what is the best yielding depth of cut.

Another question of botanical as well as of practical interest is the question, raised by ASHPANT, whether there is a marked correlation between the diameter of the latex tubes and the rubber production. ASHPANT answered this question in the affirmative and developed a theory according to which it would be possible to find out with practical certainty as early as in the nursery stage by measuring the diameter of the latex tubes what trees will be high yielding.

Dr. FREY-WYSSLING (6) subjected the correctness of this statement to a thorough investigation. According to ASHPANT a Hevea tree with latex tubes of large diameter in the bark has also large tubes in the leafstalk, while the size of the diameter of the latex tubes in an individual tree is constant during the whole duration of life, from its earliest youth (6 months), and hereditary. From this theory the conclusion was drawn that a single cut through the leafstalk of a six-months-old Hevea seedling suffices to decide in all probability whether the tree when tappable will be a good or a poor yielder.

From the careful and extensive investigation of FREY-WYSSLING the conclusion may be drawn that a certain relation but not a satisfactory one exists between the diameter of the latex tubes and the yield in grammes of dry rubber. Trees with narrow tubes are poor yielders but trees with wide tubes are by no means always good yielders. Consequently the prediction of the future production on the diameter of the latex tubes is unreliable. There are two reasons why trees with large tubes can be poor yielders: the anatomical structure of the bark may not be favourable for a high latex production or there may be physiological causes which impede such a production. In the material examined the correlation between tube bore and yield of rubber is smaller than the correlation between the number of rings of latex vessels and yield, and — as is generally recognised — even this last mentioned correlation is not reliable.

It is therefore apparent that the yield of a Hevea tree is principally based on the finer physiological characters and not on anatomical characters.

A weak point in ASHPANT's exposition is the lack of a clear explanation of his methods of measuring accurately the latex tube bore. Another objection has been made by CRAMER (1) (7). He pointed out, that even if the planter was able to make his measurement of latex tube bore as accurately as ASHPANT and FREY-WYSSLING did in the laboratory, and he selected 33 % of the trees with the largest tube bore, this $\frac{1}{3}$ part of the total of the trees would produce — according to ASHPANT's own figures — an average of 49.5 cc. of latex per tree against an average of 32.5 cc. of latex of all the trees. Such a selection would thus result in an increase of the yield of 51 %. For an increase of 150 % — which ASHPANT expected to be able to obtain — a selection of 1 in 100 plants would be necessary.

(1) Cramer's original publication in the *Planters' Chronicle* of 27th September is not at the writer's disposal, but only, a review by F. W. O. in *De Bergcultures* of 29th November 1930.

In the *South Indian Planters' Chronicle* of 22nd November (1) ASHPLANT (8) made a reply to his critics, but gave no new facts or aspects and the final conclusion can be no other than that ASHPLANT's selection method has very little practical value.

SOWING OUT.

The soil in which the Hevea seeds are laid out may have some influence on the percentage of seedlings obtained, and this may be especially the case with weakened seeds. In an experiment in Java (9) the percentage of germination on white clay and red laterite soil was only 50 %, while by the use of washed river sand the percentage was raised to 90-95 %, and the time required for germination was shortened by 10-12 days.

PLANTING DISTANCE AND PLANTING SYSTEM.

The relation between the number of plants per hectare and the yield is a problem for every crop including Hevea, but here the problem is complicated by the fact that the original number is not the definitive one, as the number of trees per hectare is reduced during several years by the thinning-out system. We are therefore confronted in Hevea culture with two problems :— 1, what is the best initial planting distance, and 2, what is the most profitable number of trees in following years?

TENGWALL has investigated both questions by means of the statistical method.

For the investigation of the influence of the initial number of trees per hectare on the yield (10) he used figures of 1173 rubberfields in Java covering an area of about 58,000 hectares. Only fields planted with seedlings were included in this investigation. Among them there are plantations with more than 1,000 trees to the hectare and even with 1,200 and above, but also plantations with from 200 to 300, or only 150 to 200 per hectare. For the major part of the plantations the number of trees was 300 to 400 per hectare. In recent years there has been a tendency to plant wider ; the use of so-called selected seed and the idea that plants from such seeds would need a less thorough thinning out, was one of the reasons.

The advice of the Experimental Stations in Java was in recent years to plant 500 trees to the hectare (if seedlings were used). But this advice was not based on conclusive investigations.

TENGWALL divided the fields in groups of 101-200 trees, 201-300 trees, etc. up to 1201-1300 trees per hectare. From his yield figures it is apparent that the closely planted fields have given a higher yield. A few of these figures may be quoted here :

TABLE II. — *Influence of planting distance on yield of rubber.*

	Number of fields	Average yield of rubber per hectare in kg.
Widely planted fields (less than 300 trees per hectare)	554	387
Moderately widely planted fields (301-500 trees per hectare)	537	407
Closely planted fields (more than 500 trees per hectare)	82	439

(1) This article is not at the writer's disposal, but only an abstract in *The India Rubber Journal* of 20 December 1930.

The conclusion is that the optimum planting distance for seedlings is not lower than 500 trees per hectare.

The next question is : What is the ideal thinning-out system ?

TENGWALL (11) applied here again the statistical method. Of 2100 fields in Java, covering an area of 13,673 hectares, he gathered figures regarding the number of trees and the yield of rubber per hectare in following years. The fields were divided according to age in 4 groups : fields of 4-8 years, of 9-14 years, of 15-17 years and of 18-28 years ; each of these groups was again subdivided according to the number of trees per hectare into 11 groups. Of each of the 44 groups the average yield per hectare was calculated. The result is to be seen in the following table.

TABLE III. — *Influence of age of plantations on yield of rubber.*

Number of tappable trees per ha.	Average yield in kg., rubber per hectare (Java)			
	Fields of 18-28 years	Fields of 15-17 years	Fields of 9-14 years	Fields of 4-8 years
71-100	348	333	252	173
101-130	384	370	306	231
131-160	387	439	403	244
161-190	463	452	410	299
191-220	408	459	430	333
221-250	396	427	441	347
251-280	?	?	484	364
281-310	?	?	434	333
311-340	?	?	?	?
341-370	?	?	?	?
371-400	?	?	?	?

In this table no average yield is given of those groups in which less than 10 fields were represented, because it was considered that no reliable average figure could be deduced from so small a number. The figures of the other groups show, that in Java in fields of 4-14 years a number of about 251-280 trees gives the highest yield, in fields of 15-17 years a number of 191-200 trees, in fields of 18-28 years a number of 161-190 trees. It is interesting to compare with these figures those which indicate what is the most generally occurring number of trees in fields of different age in Java. These numbers are to be found in the following table.

TABLE IV. — *Average number of trees in plantations of different ages.*

Number of tappable trees per hectare	Fields of 18-28 years (in hectares)	Fields of 15-17 years (in hectares)	Fields of 9-14 years (in hectares)	Fields of 4-8 years (in hectares)
71-100	223	308	356	621
101-130	1,208	796	1,495	259
131-160	3,229	7,275	4,547	1,588
161-190	6,562	7,778	7,361	1,605
191-220	1,217	5,308	4,958	3,277
221-250	648	3,402	2,213	2,331
251-280	—	—	1,214	886
281-310	—	—	659	723

These figures show that in young fields (4-8 years) generally 191-220 trees are left, in older fields generally 161-190 trees. We have seen that higher yields are ob-

tained when thinning-out is done in a less drastic way and a larger number of trees are left. Only in old fields of 18-28 years the generally adopted number of trees (161-190 trees) gives indeed the highest average yield. Speaking generally thinning out has been carried out too strongly; this is the case in no less than 66 % of all the fields in Java, in 21 % it has been done in the proper way and 13 % of the fields have been thinned out insufficiently.

It must however not be forgotten that the figures mentioned only give an indication regarding thinning practice. They are average figures from a large number of fields, growing under largely different conditions. On special soils a larger or a smaller number of trees may give the highest yield. Besides, the planting material plays a role: with selected seedlings the ideal number of trees per hectare may be different from the ideal number for unselected seedlings.

The interesting results of TENGWALL's statistical investigations show clearly how ignorant we were up till now about the most profitable number of seedlings per hectare. Still greater is our ignorance about the best planting system of budded trees (clones), which fact will not be surprising if it is realised that the planting of clones has only been started recently on a large scale so that the number of fields planted with budded trees is comparatively small.

In this matter a most important question is whether on the estates the clones must be planted separately or mixed. It may be remembered that some years ago we had little experience regarding the practical value of budded trees, and the possibility had to be envisaged that they would cause disappointment for some reason or other; at that time the Experiment Stations advised the mixed planting of budded trees and seedlings. This system is no longer considered advisable, because — speaking generally — clones have proved to be a reliable planting material. But about the respective value of the different clones we still have insufficient knowledge and this makes the planting of clones in separate fields somewhat risky. On the other hand an advantage of the separate planting is that it is easier to determine the value of each clone. This subject has been treated by different investigators in Java, in Sumatra and in Malaya (12, 13, 14, 15, 16). The advice of the Directors of Rubber Experiment Stations in Java and Sumatra has been, that, with our present incomplete knowledge of the value of the different clones, it is better for the estates to plant the fields with more than one clone in mixed cultivation, a system which allows the elimination of one or more of the clones if these are recognised as being inferior, while still keeping the fields complete. This advice was in its main lines supported by the botanist of the Research Institute of Malaya. At the same time "mono-clone" plots and fields have to be planted for experimental purposes, for investigating for each clone, what is the best planting distance, the most profitable tapping system, etc. As regards the initial number of budded trees per hectare, for the present a number of 300 to 350 trees is recommended by the Experimental Stations in Java and Sumatra.

SOIL AND MANURING.

HAINES (17) gave a succinct survey of the manuring problem of Hevea and of the results so far obtained. The only case in which striking results have been seen remains that of the 'Holland America' plantations in Sumatra: on white sandy-clay soil, where no higher yields could be obtained than 300 lbs per acre, the yield could be increased to 700 lbs after manuring with nitrate of soda or ammonium sulphate. Such conclusive results have not been obtained elsewhere.

In Java only about one-quarter of the manuring experiments gave a more or

less satisfactory increase while in the remaining three-quarters no definite conclusions could be drawn. Also in Malaya results have been on the whole inconclusive during the two or three years that manuring experiments have been running, but in the opinion of HAINES there have been enough positive results to indicate great possibilities.

The striking results above mentioned and obtained on the white soils of the 'Holland American' plantations have been described by GRANTHAM in reports, issued in 1924 and 1927. In a third report (18) he gives the continued results over the last three years. While in these years the unmanured control plots yielded consecutively 344, 405 and 401 kg. per ha., the plots manured with different quantities of sulphate of ammonia gave the following yields:

Series	1927/28	1928/29	1929/30
B	478	595	612
C	753	858	849
D	529	594	588
E	644	752	735

As GRANTHAM remarks the plot-series C and E, which have received the longest regular manuring, have reached levels which were previously quite unanticipated.

In the manuring experiment in Malaya, described by HAINES (19, 20), the effects of complete organic manure, complete inorganic manure, nitrogen only, nitrogen and phosphorus, and phosphorus and potassium were investigated. Though every treatment appeared to show an increase the increase was low.

The question of green manuring does not seem to have as much interest as it had. Little has been published on this subject. Attention has been drawn (21) to the fact, that green manuring plants absorb much moisture from the soil and that it is advisable to dig them under in the beginning of the dry season, sowing them out again when the rainy season sets in.

A new soil-preserving plant was recommended (22) as being very suitable for the purpose, viz. *Momordica charantia*, a plant belonging to the family of the Cucurbitaceae. It may, however, be considered dubious whether a non-leguminous plant will in the long run give satisfactory results as a soil covering plant.

MIXED CULTIVATION.

The system of planting a catch crop, mostly robusta-coffee, when laying out Hevea plantations has been quite general in Java and it is still applied here on a fairly large scale.

The influence of a catchcrop on the production has never been the object of serious investigation, but it has been generally assumed that the rubber trees do not suffer from it in any way.

TENGWALL investigated this influence by the statistical method and figured out the average production of fields with and without a catchcrop. For this calculation he had at his disposal yield figures of 124 fields planted with a catchcrop and covering a total area of 7099 hectares. A comparison of the average yield of the mixed and of that of the non-mixed fields shows that the yield of the mixed fields is about 100 kg. rubber or 20-30 % lower than the yield of the non-mixed fields.

Dr. C. J. J. VAN HALL.

(to be continued).

Notes.

RUSSIAN LATEX-YIELDING PLANTS. — Some interesting information regarding the so-called "root-rubber", obtained from the *Chondrilla* plant is given in the *India Rubber Journal* of February 14 of this year. It is stated, that the rubber latex is contained in a tubercle of the root. The roots are attacked by the larvae of certain insects and the latex then exudes and runs into the sandy soil, where in time it coagulates and cements the sand together. This cemented sand is called "Napliwi" and contains about 2-2 ½ % of rubber and 10 % of resin. It may be treated by pulverising, which removes part of the sand and then by washing in salt water to remove some of the resin. The composition of a sample thus treated was 10.31 % rubber and 25.60 % resin.

THE COAGULATION OF HEVRA LATEX. — A paper by Mrs. BRUMÉE-NIEUWLAND in *Mededeelingen van het Proefstation voor Rubbercultuur*, No. 44, gives some new points of view on this subject. The main facts recorded by the author are as follows: (1) When the protein is removed from latex mechanically (by creaming or by centrifuging) or by chemical means, coagulation by means of acids is very rapid; moreover, the rubber dries slowly and possesses poor strength. (2) Latex from which the protein has been removed does not flocculate after diluting to 1.9 and heating (B mixture). A coagulum is formed, however, on adding acid. (3) Protein-free latex does not exhibit a second liquid zone, *i. e.*, it no longer represents an "irregular series". (4) The addition of a protein, such as casein, to a protein-free latex, yields a rubber of increased stiffness, and the tendency to tackiness and slow drying disappears. (5) The pH value for latex coagulation coincides with the pH of protein precipitation.

As a result of this work and a study of the literature, the writer gives the following working hypothesis: It is surmised that proteins act as protecting colloids in the latex, while lipoids are present as a layer around the probably viscous interior of the globules, leading one to the following picture: globules suspended in a protein emulsion with a lipid covering layer and a viscous interior. In ordinary coagulation one might picture that at pH 4.8 the proteins flocculate and form a gel in which the globules remain suspended. The limit of flocculation of lipoids is probably lowered by the presence of proteins (as is known for lecithin from the investigations of RONA and DEUTSCH), and as soon as protein and lecithin, both hydrophobic colloids, have flocculated, only the hydrophobic stearin remains, which is then easily flocculated by the salts present in the latex so that the globules proper are no longer protected, but remain enclosed in the gels. The latter flocculation is irreversible.

COMPARATIVE DROUGHT RESISTANCE OF SORGHUMS AND MAIZE. — In the *Journal of the American Society of Agronomy* of December 1930 a study is published by MARTIN on the different behaviour of sorghums and maize under extreme arid conditions.

The marked superiority of sorghums over maize in the dry south-western States makes the comparison a useful one. The maize plant is similar to sorghum in size, appearance, season and type of growth. The two crops are often grown on the same farm and by identical methods. The grain sorghums directly compete with maize as a grain crop. Most of the grain sorghums are grown where the climate is too dry and hot for successful maize production. The zone of transition between the predominating acreages of maize and grain sorghum in Kansas lies approximately along the line of an annual precipitation of 25 inches. Where grain sorghums are grown to a considerable extent under conditions of higher rainfall, the soil usually is shallow and incapable of holding ample moisture for a good crop of maize.

An investigation of the difference between these two plants showed the following important points.

Sorghum leaves and stems have a waxy and cutinized epidermis which reduces evaporation. Sorghum plants are less leafy than maize and have more secondary roots. Sorghum leaves have more stomata per unit of area and smaller stomata than maize leaves, sorghum in each case showing typical xerophytic characters. The osmotic concentration of leaf juices is lower and that of the stalk, crown and root juices is higher in sorghum than in corn. Sorghum stalks have a lower moisture content than corn stalks. It also has a lower transpiration ratio under conditions of high evaporation. Its leaves and stalks wilt and dry more slowly than those of maize and thereby permit sorghum plants to withstand drought longer than maize and they may subsequently

recover when moisture becomes available. Sorghum plants can send up tillers and still produce a crop if rains come after the main stalks have been killed by drought.

Within the sorghum group are differences both in drought resistance and the ability partly to escape drought injury. The *kafirs* as a group probably are the most drought-resistant of the grain sorghums from the standpoint of resisting desiccation of their tissues. They are among the least able to produce a crop of grain under adverse moisture conditions, however, unless the delayed rains come in time for kafir to head and mature a crop. *Milos*, *feteritas* and *kaoliangs* tend to produce small heads and little grain in very dry seasons. *Kaoliangs*, *feteritas* and *Freed sorghum* are extremely early, very sparsely leaved and are able to produce some grain with very little moisture. In these early varieties the grain is formed before the moisture supply is completely exhausted.

THE EXPLOITATION OF KARITÉ-TREES IN FRENCH WEST AFRICA. — In the *Rev. de Bot. Appliquée et d'Agr. Trop.* for December 1930, some useful information is given with regard to the exploitation of the oilseed producing Karité (*Butyruspermum Parkii* Kotschy) by E. ANNET.

This tree belongs to the family of the Sapotaceae, and as an oil producer plays in the Sudan about the same part as the olive in the Mediterranean countries. The tree is to be found between lat. 8° and 14° N., but in the Upper Nile and Congo basins it penetrates still farther south; it is confined to the grass jungles which occupy that part of Africa that stretches from the tropical forest regions to the desert. During those months in which the hot and dry desert winds blow the trees remain dormant.

The fruits, of the size of a prune, contain two thin-shelled nuts. Their kernels have a high content of solid fat. Ripening takes place from May till August. The fruits of a tree ripen almost simultaneously, but the ripening period of the trees differs greatly. The kernels contain about 50 % fat. As however this fat contains 5-8 % non saponifiable substances, it is not of much interest for the soap industry.

The natives make much use of it, but by their primitive methods they do not obtain more than 14 % fat from the kernel.

The greatest obstacle to the exploitation of this product is the lack of means of transportation; the centres of production being from 600-1800 km. from the ports. Exports for this reason are still of not much importance: the quantity of fat averaged about 2500 ton per year (1926-1928) and of kernels about 1100 tons.

It is however estimated that by a better system of exploitation and improved transportation conditions exports could increase to 15,000-20,000 tons of fat.

Not much is yet known about production per tree or about the varieties of this species.

REVERSE SLOPE DRAINING IN HILL COUNTRY. — In the December number of the *Renseignements Techniques* (p. 500) an article by BAGOT was mentioned on this subject in relation to the prevention of erosion. In the *Tea Quarterly* of November 1930 the same author gives some more information concerning the results obtained by this system and the most useful method of construction.

In a field, where the ordinary drains were in existence, a siltpit 5 ft × 5 ft × 5 ft was cut at the bottom of each of four leading drains. After three inches of rain had fallen in five days these pits were all filled with silt which had emptied into and out of these leading drains. 500 cubic feet of soil had thus been lost in five days from about five acres of land. This loss would have been prevented by reverse-slope drainage.

WITHERING AN IMPORTANT PART IN THE TEA MANUFACTURING PROCESS. — In order to make a good black tea the leaf must be withered. The reason for withering is not wholly clear. The chemical changes concerned, so far as they have been estimated, appear to be small and unimportant. The physical need for withering is obvious because fresh leaf will not roll easily. But more important is the fact that a withered leaf is more damaged by rolling than turgid or fresh leaf. The more damage a leaf receives in rolling the more are the juices exposed to the air during fermentation or oxidation. Experiments have shown that well withered leaf on rolling absorbs more oxygen than unwithered or lightly withered leaf. This results from the more complete rupture of the leaf cells and a greater exposure of the juice.

It may be argued that if the chemical changes in withering are negligible, then sufficient rolling or mashing of fresh, unwithered leaf should give as good liquors as ordinarily rolled withered leaf. Admittedly the appearance of the finished tea would suffer in the former case and much leaf juice would be lost in rolling.

In order to observe the effect of withering, tea was made from leaf fresh from the bush and from similar leaf normally withered. When these teas were exhaustively extracted with boiling water for an hour about the same amount of tannin, caffeine and soluble solids were extracted in each case. When infused for 5 minutes, however, the tea made from the withered leaf gave more soluble solids and tannin than the other tea. Hence, withered leaf appears to give a tea which is more easily extracted than tea made from fresh leaves.

The two teas were examined by a tea taster who described that of withered leaf as "good tea", and the other as "characterless". The fact that the unwithered leaf gave a tea lacking in properties peculiar to tea suggests that tea aroma and flavour, properties usually associated with the essential oil of tea, were missing. It is thus possible that, during withering, certain reactions go on or certain conditions are brought about which make for the development, during fermentation, of the essential oil responsible for the tea aroma.

During withering the physical state of the leaf colloids changes. Since fermentation is concerned with these colloids, it is probable that their physical state will influence the course of fermentation. The change taking place in the colloidal state will be dependent on the rate of drying of the leaf and the temperature at which it is dried. In this manner some of the characteristics of the tea made will be influenced by the way in which the leaf is withered.

The opinion is held in some quarters that the quality of Ceylon teas is largely the result of controlled withering. (*The Indian Tea Association. Scientific Dep. Part IV. 1930*).

THE ACIDITY OF TEA SOILS IN NORTH INDIA. — In the *Quarterly Journal*, Part IV, 1930, of the Indian Tea Association (Scientific Department) HARRISON gives a valuable article on the acidity of tea soils and the characteristics of the soil caused by it. He gives the following results from his investigations.

Soil acidity is due not to free soluble acid, but to colloidal clay and humus complexes. Complex aluminous silicates play an important part in the acidity of tea soils in North East India.

The "Hopkins" or "lime requirement" method of estimating soil acidity, though very useful, may give misleading results especially in the case of low acidity.

The pH methods both colorimetric and electrometric are valuable aids in determining the suitability of a soil for tea and in recommending manurial treatment. The pH of the solution obtained by extracting a soil with a neutral salt solution such as nitrate of potash, is of very great value and this figure taken in conjunction with the pH value of the soil water gives an idea of the "reserve" acidity in a soil. Soils with no "reserve" acidity and very low soil water acidity are unsuitable for tea.

The general pH range for good tea soils is pH 4.5 to 6.0 for the soil water, and for the neutral salt extract, pH 3.5 to 5.5.

Acidity determinations are of use in deciding whether land is suitable for new planting or replanting of tea, for detecting previous lime treatment and for making manurial recommendations.

Sulphur effectively reduces soil alkalinity but is expensive and in many cases uneconomic in practice.

Sulphate of ammonia increases acidity considerably, green crops and organic manure have no appreciable effect, while with potash and soda salts the final result is a reduction of acidity. Phosphates, acid or alkaline, reduce soil acidity.

THE EFFECT OF MANURING ON THE QUALITY OF TEA. — Among tea merchants the idea is very much adhered to that large yields coordinate with poor quality and that by manuring quality is depreciated, although yields may improve. A more specific charge is sometimes made that certain manures have an adverse effect on quality. The soluble, quick acting nitrogenous manures, sulphate of ammonia and nitrate of soda particularly, lie under suspicion.

For this reason some experiments were made in North East India, which are reported on by COOPER and HARLER in the *Quarterly Journal*, Part IV, 1930 (Indian Tea Ass. Sci. Dep.). The teas which resulted from these experiments were reported on by three separate tasters.

It was seen, that the heavily manured areas usually give teas with preferable leaf but inferior liquors to those from unmanured or lightly manured areas. The tea on both manured and unmanured areas was plucked at 7-day intervals. In this time the heavily

manured tea was over ready and had to be broken in many cases. Had plucking on the manured areas been at 6-day (or at times even 5-day) intervals, these teas might not have shown any inferiority in liquors.

The experiments as a whole indicated that manuring generally has no great effect on quality so long as plucking is fine and at close intervals.

EXPERIMENTS WITH RUBBER BUDDING. — The Experiment Station at Peradiniya (Ceylon) started a number of experiments on this subject on which HOLLAND reports in *The Tropical Agriculturist* of January 1931. The results may be summarised as follows :—

It was found that there was no apparent advantage in the stock being taken in a state of active growth at the actual time of budding. There was no apparent advantage in budding on dull days rather than on sunny days; in fact the highest percentages of successes were obtained under the latter conditions. From an examination of the rainfall five days before and ten days after budding it appeared that a higher percentage of successes was obtained in the period of lesser rainfall.

Considerable differences in the percentages of successes obtained were apparent in different clones and it is believed that the individual suitability of a mother tree for successful budding and the state of budwood used are two of the most important factors influencing success.

It was found that large two-year old stocks could be successfully budded on the other side after the original budding was definitely recorded as a failure. But considerably greater success was obtained by budding on vigorous one-year-old stocks in the nursery than on stocks two-years-old or more in the field.

STERILE CACAO TREES. — In the *Tropical Agriculturist* of January 1931 HAIGH reports on an experiment in regard to sterile cacao trees. At the Peradiniya Station a cacao-tree bears abundant flowers but has never been known to bear a pod. Comparative tests were carried out at the same time with pollen of a very productive tree. Only fresh pollen was used from flowers picked in the early morning and sown on 1.5 % agar in Petri dishes.

Normal pollen germinates in a few hours but for convenience the pollen was examined twenty-four hours after sowing. From the good tree 4664 pollen grains were examined of which 72.4 % had produced a germ tube; from the sterile tree 4191 grains were examined of which only 0.36 % had germinated.

Although it is generally held that the cacao flower is in the main self-fertilised, HOLLAND has shown that cross-fertilisation occurs. It is still necessary therefore, in accounting for the complete sterility of the tree, to explain the failure of cross pollination.

YIELDS OF DIFFERENT COFFEES. — *The Tropical Agriculturist* for January 1931 gives the following figures for average yields of different coffees in kg. fresh berries per bush, for the 7 crop years from 1923-24 till 1929-30.

<i>Robusta types :</i>	Highest	Lowest	Average	<i>Liberian types :</i>	Highest	Lowest	Average
Robusta	3.84	1.07	2.49	Excelsa	11.77	2.50	8.55
Uganda	4.04	0.93	2.65	Abeokuta	14.52	4.12	8.83
Quillon	6.05	1.54	2.88	Liberia (Pasir Pogor)	13.36	3.00	7.88
Canephora	4.63	1.35	2.88				
Hybrid	4.41	2.33	3.38				
<i>Arabian types :</i>							
Arabia (plot 140)	1.47	0.54	0.93				
Kents	0.83	—	0.40				
Jackson's Hybrid	—	—	0.63				

BIBLIOGRAPHY ON SUGARCANE AND CANE SUGAR TECHNOLOGY. — At the Third Congress of the International Society of Sugarcane Technologists, held at Soerabaya, Java, in June, 1928, a resolution was unanimously adopted in which was expressed the need of a periodical in which the bibliography on sugarcane and canesugar technology should be published as completely as possible and in a language to be understood by all interested in this field.

The committee appointed in accordance with this resolution consisted of H. P. AGEE (Hawaii) Chairman; K. DOUWES DEKKER (Java); R. FERNANDEZ GARCÍA (Porto Rico); A. H. ROSENFELD (Louisiana) and W. B. SALADIN (Cuba).

The chairman, with approval and consent of the other members, has authorised the general chairman of the Society to enter into negotiations with Mr. E. W. MAYO, Editor of "Facts about Sugar". A preliminary conference accordingly has been held between Mr. Mayo and the general chairman and the former has agreed to publish all abstracts which the Society may furnish through any or all available channels. A section with appropriate heading will be set aside, and pursuant to the wishes of the committee, abstracts concerning the agricultural phase of the cane sugar industry will be separated from those relating to the manufacturing side.

Owing to the character of the Society, sugar beet growing for the present will not be considered, but it is desired to include beet sugar manufacture, because in the manufacturing field the problems of the two industries are in many instances similar.

M. B. S.

RURAL ENGINEERING

Notes.

FARM ENGINEERING IN BRITISH INDIA. — This country has hitherto done very little for the mechanisation of its agriculture although modern scientific equipment is undoubtedly of importance in the country from the point of view of methods of cultivation. On the other hand irrigation works in India are among the most important in the world and some of the most extensive of all are at present under construction in the Bombay Presidency, e. g., the damming of the Indus at Sikkur, which will make possible the irrigation of about one million hectares, of which 600,000, at present completely waste, can be used for wheat growing. (*Berichte über Landwirtschaft*, Berlin 1931, Band XIV, Heft 2, p. 350-351).

INCREASED USE OF FARM MACHINES IN NEW ZEALAND. — As a result of the great development of agriculture in New Zealand in recent years there has been a great advance also in mechanisation. Most of the machines are imported from the United States but local manufacturers have made great progress and now supply most of the harrows, cultivators and similar equipment. Recently experiments have been made with harvester-thrashers and it is reckoned that at the present time 18 of these machines are at work, of which 14 come from Australia and 4 from the United States. This type of machine however does not seem to have any very good chance in New Zealand where the strong winds make it impossible to leave wheat standing for any considerable period. The future seems rather to belong to windrowers and auto-thrashers. (*Berichte über Landwirtschaft*, Berlin 1931, Band XIV, Heft 3, p. 547).

EXPORT RETURNS FOR AGRICULTURAL MACHINES IN THE UNITED STATES DURING THE FIRST HALF OF 1931. — The attached table gives the comparison for the 20 chief importing countries of the figures for the first half year of 1930 with those of the corresponding period in the previous year, the values being expressed in dollars.

Importing Countries	1929	1930
	First half year	First half year
Soviet Russia	7,056,447	3,251,259
Canada	24,690,919	17,281,740
Argentina	14,509,798	9,219,385
Australia	2,806,872	2,058,067
Algeria and Tunis	2,465,800	2,005,680
Mexico	1,021,481	1,703,411
France	1,675,034	6,623,376
Irish Free State	493,882	1,535,035
Union of South Africa	2,955,090	1,513,983
Great Britain	1,005,234	1,195,372
Italy	493,882	990,330
New Zealand	723,362	817,520
Uruguay	563,432	711,249
Sweden	565,167	804,154
Germany	1,396,741	535,672
Czechoslovakia	135,680	475,808
Cuba	709,335	414,711
Morocco	496,942	400,244
Brazil	766,252	383,138
Spain	477,334	322,909
Total value	64,619,633	74,008,013

By adding to these total values, those for the exports to the other countries not included, a total of about 79 million dollars is given for the first half year of 1930 as compared with a total of about 72 million dollars for the first half year of 1929. (*Berichte über Landwirtschaft*, Berlin 1931, Band XIV, Heft 3, p. 568-569).

IInd INTERNATIONAL CONFERENCE FOR THE STANDARDISATION OF FARM MACHINES, COPENHAGEN, 6 May 1931. — The following items were included in the Agenda of this Conference: (1) Lubrification cups — (2) Cutter bars for mowers and harvesters — (3) Tractor couplings — (4) Power take-off — (5) Space between the teeth of the cutter bars of mowers — (6) Teeth of mower cutter bars — (7) Springs for cultivators — (8) Springs for horse harrows — (9) Floriculture and the varieties of pots used — (10) Standard dimensions for separators.

NEW TYPES OF SMALL-SIZED TRACTORS. — Contrary to the generally accepted views, the interest in and demand for small sized tractors have in recent years shown a remarkable increase, more particularly in mountain districts where there is much subdivision of holdings. Switzerland may be said to be the leader of the movement and has turned out rotary tillers for garden work and various kinds of auto-mowers and small tractors such as those of HÜRLIMANN and BÜHRER.

Two new types of small tractor have also recently been manufactured in Germany, in which the problem of adequate grip on the soil has been solved in the one case by utilising four driving wheels and in the other a single caterpillar attachment. In the small HEUMANN tractor, the supporting wheel is simply a single caterpillar, behind which a small driving car is attached. Despite the simplicity of the machine the tractor can make turns of quite short diameter. It requires a 10 HP motor and its weight of 1200 kg. makes it relatively heavy. This is however advantageous from the point of view of the transmission of traction power and it appears that its performance is excellent.

WEBER Brothers (Bad Kreuznach) have put on the market a small fourwheeled tractor which weighs 425 kg. The axles are only 65 cm. long and, as that in front can turn so as to describe an angle of 90°, the motor is very easy to drive. The yield at the coupling point is about 50%. (*Die Technik in der Landwirtschaft*, 1931, No. 4, p. 111-113).

INFLUENCE OF DRIVING WHEELS ON THE RUNNING EXPENSES OF TRACTORS. — With the assistance of the *Reichskuratorium für Technik in der Landwirtschaft*, Herr Ernst ZANDER has carried out a series of experiments on the influence of the driving wheel on tractor running costs, of which the results have been published in *Die Technik in der Landwirtschaft* (1931, No. 4, pp. 114-123) and allow the following conclusions to be drawn:

There is no economic advantage — at any rate so far as light and average soils are concerned — in driving wheels with a diameter of 1.05 m. such as are used in a large number of tractors as a result of the influence of the "Fordson". For all ordinary types diameters of from 1.25-1.30 m. are to be recommended and for very light soils a diameter of 1.5 m. Wheels of this diameter are also serviceable on stiff soils, requiring a high degree of cultivation and particularly when potato and maize crops are grown, since they supply adequate free passage above the plants.

Another very important matter is the proper gradation of the three speeds. The results of the tests show that, if the driving wheels are of the normal diameter of 1.25 m., the scale should be 3-4.5-6 km. per hour. If the diameter is 1.5 m. without any increase in the dimensions of the tractor the grading should be 3.6-5.4-7.2 km. per hour which is quite suitable for light soils. On such soils it would thus be possible to increase output by an average of 25 % while at the same time reducing the fuel consumption for the actual ploughing by 15-20 %.

INFLUENCE OF SPEED ON THE WORK OF THE PLOUGH AND SIMILAR IMPLEMENTS. — Following on previous experiments as to the influence of speed on the work of ploughs, etc., Professor FANTONI has carried out a series of trials on relatively stiff soil, forming part of the property of the University of Zagreb in Yugoslavia. From these he has arrived at the conclusion that when ploughing proceeds slowly, the folds of earth are also turned slowly and when in position remain almost unbroken. When the plough

moves at a quicker rate it casts, scatters and breaks up the soil. When the plough passes from one speed to another it reaches a stage where it begins to scatter and disperse the turned earth, which the writer calls the "dispersion limit".

In order to secure a proper breaking up of the soil it should be worked at a speed of about 0.5 km. per hour in excess of that which corresponds to this "dispersion limit". According to the trials made by the writer, in a soil thus ploughed, seeds develop better than where ploughing has taken place at a slower rate. Although an increase of speed in the rate of ploughing requires a relatively larger output of power in the proportion of 100 : 108, the improvement in the ploughing return makes it desirable to maintain a ploughing speed about 0.5 km. per hour faster than that corresponding to the "dispersion limit" speed, which, in the particular case of stiff soil referred to, is about 5.5 km. per hour. (*Fortschritte der Landwirtschaft*, Berlin-Wien 1931, Heft 5, p. 147-149).

H. J. H.

ANIMAL HUSBANDRY

Present Tendencies in European Pig Production.

The economic changes which took place after the war have had important consequences for the meat supply. In this article it is proposed to give an account of the effect of these changes on pig production. For this purpose an outline of the circumstances which have modified market conditions is indispensable.

The steady increase in the consumption of frozen and chilled meat is due partly to the fact that the purchasing power of the classes consuming meat is decreasing, and partly to the improvement in the preparation processes. It is mainly chilled meat which will in future compete with fresh meat, as only first class material can be subjected to the process of chilling as opposed to freezing, and the product differs very little in taste from fresh meat. Moreover the development of the chilled meat industry makes possible a great increase of live stock in countries which are too far distant from the large consuming centres to supply them with fresh meat.

Frozen and chilled meat is for the most part beef, although pig production is also affected by the increase in consumption of frozen meat.. However the new developments of pig production are more especially due to the changes in the fresh meat and fat markets.

Changes which have taken place in the fats market.

The two most important factors in the present situation are the marked preference shown by the consumer for vegetable fats, and the great progress made in the industrial elaboration of fats. Fats are of special importance in the manufacture of margarine, in which the use of beef and pork fats is being largely replaced by whale fat, now that it is possible to free the latter of oil. The importance of this innovation is shown by some Norwegian statistics given below, which show the production of whale oil from 1919-20 to 1928-29. An enormous increase has taken place in the production of whale oil during this decade, the increase in the oil yield being much out of proportion of the number of whales captured.

According to GRUNOW the importation of fish oils into Germany has quadrupled during the last five years. The German margarine industry has processed, so as to obtain an edible product, the following quantities of whale oil: in 1928, 64,500 m. tons — in 1929, 80,000 to 85,000 m. tons — in 1930 100,000 to 115,000 m. tons.

Owing to the increase in the production of whale oil, there will probably soon be a keen competition between it and other animal fats. In December 1930 whale oil cost £16 a ton in London and the cheapest vegetable oil, *viz.*, soya bean oil (naturally much cheaper than beef or pig fats) cost £19-5s. a ton.

Other factors which tend to diminish the demand for pig fats are the ease with which an increased production of vegetable oils and fats may be obtained, and the lowness of their prices in comparison with pig fats. The danger of this increase in production is the greater since for some time to come it may be effected without entailing any high installation costs. On the other hand, countries producing vegetable oils and fats are in a position to devote large sums to an effective propaganda.

The increase in the use of vegetable fats and of whale fat has had the immediate result of reducing the use of pork and beef fats. This reduction may, however, be partly due to a change of taste on the part of the consumer. In fact KEISER believes that it may to a great extent be the result of new methods in work, increase of sports, and, in short of all the changes of modern life.

The changes which have occurred in the consumption of fats is made clearer by the following comparative table. It shows the quantities of different fats used by the German margarine industry in 1913 and 1928.

	Vegetable fats	Fish and whale oils	Animal fats
	m. tons	m. tons	m. tons
1913	80,000	—	90,000
1928	317,000	64,500	22,900

(From *Blätter für landwirtschaftliche Marktforschung*, Berlin 1931 No. 9, p. 437).

In considering the changes which have taken place in the fat markets, changes in supply must not be forgotten. The sharp competition between American and European lards in European markets make it increasingly difficult to obtain a remunerative price for the European product. The Central and Eastern European countries were those which produced and exported lard, a fact which was already evident in the distribution of breeds among their pigs. The agriculture of these countries which is poor in capital could not maintain the competition with the American exporters who sold their goods at long term credit. Consequently American lard rapidly conquered all the best European markets.

Changes in the fresh meat market.

Although in this field the changes have not been so radical as in the fat markets they have none the less had a definite influence upon pig production. In recent years the pork market has become a market of standardised products. Nowadays the demand is for a certain kind and quality of meat which must be equal and uniform. In other words the tendency is unmistakeably to standardisation. The producer must be continually in touch with his markets and, in order to secure a sure and remunerative sale, he must endeavour, as far as possible, to supply the quality demanded by the market.

In the fresh meat market a young lean meat is in greatest demand. The more suitable designation would be mature lean meat. It is obtained by an intensive feeding of the young animals, of such a kind as to produce not fat but muscular mass.

The large demand for this kind of meat seems to be due to the change in the

mode of living and working among the mass of the population. The greatest demand is in highly industrialized countries. The general direction of taste is largely determined by the location, occupation and constitution of the consumer, and also by the season. Thus in England it is only young pigs of light weight which are in demand for the fresh meat markets. In Germany it is almost the same except that the weight is rather higher. It is also interesting to note the way in which the new mode of life among workmen has modified the demand in certain markets such as Chemnitz — an essentially industrial town. According to WILSDORF there used to be a great consumption of fat animals of a certain age, whereas now the worker no longer wants fats in the form of bacon, suet or lard and producers are obliged to supply young immature pigs. A brief reference may be made to SCHMID's remarks about the Swiss meat market. In the great industrial areas of East Switzerland young lean meat is in demand, as in England. In central and western Switzerland, on the other hand, owing to the influence of French cooking more relatively fat meat is used. However, lately the demand is for young lean pigs in western Switzerland in consequence of a change in taste which has been observed also in France and which has already been pointed out by several different writers (VORTELIER, FOUCAULT, etc.) at the Congress of Pig Breeding and Feeding (Paris, November 1928).

The curing market is influenced chiefly by the demands of the English market. There is a large consumption of bacon in England. The importance of this consumption upon pig breeding all over the world is shown by the bacon imported into England. This importation is increasing. During the four years previous to the war the mean importation was 2,590,000 quintals, in 1929 it reached 4,012,344. Owing to its activity, the English market influences pig production in large regions, not only of the British Empire and Europe, but also of the United States. It is interesting to examine the extension of bacon production in countries in the east and south east of Europe. For instance, the agricultural countries in the Danube basin which, until the war, produced fat pigs almost exclusively are now preparing bacon in ever increasing quantities. They have, in fact, supplemented their stock of pigs which used to consist mainly of fat breeds, by the introduction of a lean type of pig. It is the same in Hungary where, side by side with the predominating fat breed, the Mangalicza, the production of lean meat breeds is continually increasing. This is chiefly in order to produce more bacon, but also in order to satisfy the growing demand for lean meat.

For some years the manufacture of bacon has played a part in those countries which formerly furnished the English markets with fresh meats. Since England forbade (in 1929) the importation of fresh meat these countries (e. g. Holland) have been obliged either to begin or to develop bacon production. This has made necessary the partial modification of their pig breeding.

In comparison with the enormous number of pigs which are used for the manufacture of bacon the number used for other kinds of curing (all kinds of sausages) plays only a secondary part. This utilisation is confined chiefly to the continent, but the type of pig required varies greatly according to the locality and the season. It is moreover relatively small. Thus WILSDORF calculates that the total demand for pigs in the German curing industry (sausages, etc.) is less than 10 % of total consumption.

The effects of the changes in the markets upon breeding.

The chief causes of these changes are (1) the fact that the demand for fat animals is continually decreasing owing to bad market conditions for pork fat;

the elimination of the fat meats in fresh meat trade — (2) the fact that the demand for young lean pigs is continually increasing in the fresh meat trade and also for pigs well adapted for high class curing, above all for bacon. The types which are in greatest demand today will now be described.

Although it is possible to recognise a general tendency to separate the different types, the requirements of different markets do not yet coincide. In different localities there exist marked differences in demand. This may be attributed to the difference in the economic and social status of the buyers, to their different manner of life and also to inherent differences in the places themselves.

The standard of the different classes may be defined by weight and age limits as well as by the minimum requisites in the quality of the meat. It is obvious that this division into classes cannot be absolutely fixed. It is subject to changes dependent upon the season and on market fluctuations. In the hot season, for instance, the need of meat, and, to an even greater extent, of fats decreases, and consequently during this season in most countries pigs are killed in smaller numbers and of lighter weights. Even more decisive are the variations due to market fluctuations. If a reduced supply has sent prices up, the pig breeder endeavours to convert into meat as much feed as possible and owing to the small number of animals available their live weight will be much higher. On the contrary if the price is lowered by over-supply the breeder will sell his stock sooner and before it attains so high a weight as in the former case.

The following is the *classification for the fresh pork market* given by HAMMOND for the London market: fresh pork is obtained from "porkers" weighing from 33 to 44 kg. — "porkets", from 44 to 55 kg. — "cutters" from 55 to 72 kg. Other English writers indicate practically the same figures. Thus DAVIDSON states that among young pigs fed intensively, those from 40 to 50 kg. pay best. In some parts of England where there is less insistence on getting very young pigs, those from 60 to 70 kg. still pay well. According to an article entitled "London's Requirements in Porkers" in the *Farmer and Stock Breeder* of 10 March 1930, the preference is for pigs weighing less than 80 lbs. (36 kg.) net, but pigs weighing from 80 to 120 lbs. (36 to 54 kg.) are also bought. The quality of the meat must be good with plenty of lean, and the head and neck should not be too heavy nor the hams too long.

The demands of the British market find clear expression in the provisions of the Smithfield Club Cattle Show, which may be considered to be the first slaughter cattle show in the world and in which both live and slaughtered animals are shown at the same time. In the group of pigs for consumption as fresh pork best suited to the London market, that of "porkers", a distinction is made between the light weights and those of average weight, the latter being the "porkers" properly so-called: for the former, the maximum weight is 45 kg.; for the second, the minimum weight is 45 kg. and the maximum 64 kg. The average age is from 3 $\frac{1}{4}$ to 3 $\frac{3}{4}$ months for the former type and about 4 $\frac{3}{4}$ months for the porkers properly so-called.

In England the characteristics of animals intended for the fresh pork market are low live weight and tender age. The same tendency is found on the continent, but both weight and age are higher than in England. In Germany, for example, according to WILSDORF, the weight at slaughtering is from 99 to 100 kg. In addition there are local variations according to the markets and also seasonal and other variations which depend on market fluctuations. As examples of local variations may be quoted: Hamburg 75 to 90 kg.; Frankfort 90 to 95 kg.; Breslau (in summer) 90 to 125 kg.; Berlin 95 to 110 kg.; Dresden 95 to 110 kg.; Dussel-

dorf 80 to 85 kg., etc. As regards the Swiss markets, SCHMID describes as follows the type in demand as roasting pork: "ready for killing at the age of from 6 to 8 months, with a live weight of from 70 to 80 kg.; early maturing; slender bones, brawny; head and shoulders slender; the flanks, the line of the back and that of the belly should all show firmness; with loins and hams with good muscular development and an average yield of meat at slaughtering of not less than 80 per cent.". The requirements of the large European markets are nearly those just described; as a rule they absorb the higher weights better than do the markets of England and Western Europe. Besides the type of pig intended only for consumption as fresh pork, the Continental markets also have a demand for a rather older pig (from 8 to 10 months sometimes even more) and heavier (about 120 kg.) intended both for immediate consumption and for the preparation of hams.

As already stated, among *pigs for curing*, the most important are the bacon-pigs or "baconers". Breeders of "baconers" must conform exactly to the requirements of the English market, the sole purchaser of bacon. According to HAMMOND, the weight of baconers is from 72 to 111 kg.; according to DAVIDSON from 70 to 90 kg. At the carcass competition of the Smithfield Show 73 to 100 kg. (160 to 220 lbs.) is indicated as the limits of live weight for the pigs most suitable for bacon production.

On the continent of Europe the demand of the pork curing industry is usually for pigs heavier than bacon pigs. It has already been shown, however, that the total requirement of this industry is not large enough to make it remunerative to breed pigs specially for the purpose. In Germany the industry makes a demand for pigs weighing more than 120 kg., the weight required for Frankfort sausages is 120 to 125 kg. In Switzerland the demand is for the weights between 120 and 170 kg., in France from 90 to 110, etc. These pigs are killed older than pigs for fresh pork; in any case after 12 months.

Other reasons rendering it advisable to give a new direction to pig breeding. — The *shortage of capital* which is generally to be noted in agriculture in Europe makes it necessary to sell products rapidly; this is easier if flesh or lean meat is to be produced rather than fat, as the flesh is formed during growth and flesh formation stops as soon as the animal is full grown. It is then that the fat formation begins and continues to increase while that of flesh is diminishing. On this point some instructive investigations have been made by LEHMANN showing the composition of pigs at various ages.

Pigs	Flesh	Fat	Ash
	%	%	%
New-born	94	2	4
Weighing 20 kg.	76	21	3
» 100 kg.	55	42	3

The production of meat or flesh thus makes possible a *more rapid turnover* of capital than the production of fat.

In addition less feeding is required for flesh production than for fat production. This is shown by RICHARDSON with the help of the following comparative numbers, which indicate the quantity of nourishment necessary for increasing the live weight by one kg.

	Pigs weighing		
	50 to 100 kg.	100 to 150 kg.	more than 150 kg.
Food required for increasing live weight by one kilogramme. .	1	1.5 approx.	2 approx.

Another reason for production of low weight pigs for meat is that they are *more readily marketed*, especially when there is a surplus production. In fact, as already noted, surplus production itself results in a decrease in weight of pigs for slaughtering. In this connection it is of interest to note the efforts at present being made in Germany to persuade farmers to sell their pigs younger. It is well known that of late the head of pigs in Germany has so much increased that a disastrous decline in prices is anticipated. The Committee of experts appointed by the *Reichsernährungsministerium* issued a warning in regard to this danger some months ago, adding that it could be averted by effecting a reduction in the average weight of pigs for killing. In this way the sale of products would proceed more rapidly and the total quantity of meat necessary would be supplied by a larger number of pigs, thus automatically relieving the market congestion. RICHARDSEN, in an estimate of all the advantages of the production of light weight pigs goes further and proposes that on all the principal markets, the pigs exceeding a certain live weight — to be fixed — should be liable to a tax of one RM per each kilogramme exceeding the limit.

Measures for the production of types of pigs at present in demand. — It has been seen that the market demand is now for two types of pig well differentiated; one for the production of fresh meat and another for cured porkflesh, especially for bacon. This new tendency suits the breeder also for other reasons relating to the economy of the farm.

It may be admitted that, according to the results of investigations on flesh and fat formation, capacity for flesh forming is much more dependent on hereditary predisposition than is the case with the formation of fat. It must be concluded that to obtain a good breed, tests must first be made to discover the real output of the animals. This is already being done by means of a *system of check kept on yield in live pigs and in dressed carcass*, a practice which appears to be developing to an extent which is encouraging.

It has been seen that flesh forms only during the growing period of the animal. On the other hand the market demand is for young animals. The breeder has thus to reconcile the two requirements by finding the exact degree of early maturity. An animal maturing too early becomes full grown too soon and thus begins to put on fat before having reached the right weight for killing.

On the other hand, a pig that matures too slowly reached this weight when it is too old. The precocity must accordingly be determined in such a way as to obtain at one and the same time the production of flesh and the weight required for killing.

The number of breeds that will yield the types required is now very large and varies according to the country. It may be concluded that in *modern pig breeding the obtaining of type is more important than the selection of the breed*, which illustrates very clearly the importance now attached to crossings made in view of utilisation. Modern requirements in pig production tend to render this production uniform, to establish merely certain standardised types and to level the breeds.

CONCLUSIONS.

I. — The new tendencies appearing in pig production point to a new direction in their breeding. The causes of this are found in the changes which have taken place on the market for fats and for meat.

On the *market for fats*, the animal fats produced by the farmer are subject to keen competition from the increasing use of vegetable fats and whale fat which are less costly. In Europe there is also the competition with American lards.

On the *fresh meat market*, the change in taste that is going on is in favour of the lean meat of young pigs rather than the fat meat of the older fully fattened pigs.

On the *market for cured porkflesh*, the supply of bacon is of great importance.

In consequence of these changes two types of pig are now acquiring in Europe a general importance: 1. a lean pig young, light weight, early maturing, for the supply of fresh pork — 2. a lean pig rather older, early to moderately early maturing, for the manufacture of cured porkflesh, especially of bacon.

These types are differentiated: in addition, there are local variations, some seasonal and some due to market fluctuations. The most uniform requirements are those for the baconer, which is much the most important for group 2; all breeders must take into account the requirements of the largest purchaser of bacon, the British market.

II. — The breeder is interested in producing light weight lean pigs on account of the more rapid turnover of capital that results and of the smaller quantities of nourishment required for increasing the live weight by one kilo. This procedure has besides the advantage of relieving congestion on the market at times of surplus production.

III. — On the technical side of breeding, it is important to combine satisfactorily the two factors of meat production, purpose and precocity. The careful checking of the output in yield in live pigs and in dressed carcase is of great importance for the selection.

Breeding tends now to attribute more importance to *type* than to *race*; the aim is a uniformity which will automatically eliminate differences in breed.

F. MOSKOVITS.

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Notes.

Horses.

PRIVATELY OWNED STALLIONS IN FRANCE. — In response to a request for information concerning the numbers of State-owned stallions, approved stallions, authorised stallions and the numbers of mares served, the Minister of Agriculture for France gives the following figures:—

Year	State stallions	Mares served	Approved and authorised stallions	Mares served
1928	3 266	157 394	2 748	151 422
1929	3 275	145 335	2 646	151 212
1930	3 261	126 141	2 977	147 742

(*Le Progrès agricole*, 1931),

RIDE OF COUNTRY HORSEMEN THROUGH HUNGARY, MAY 1931. — This ride, which is organised like that of 1930 for purposes of horsemanship and horse breeding propaganda, will pass through the whole country between May 10 and 31 and will give opportunities for the riders to visit a number of model farms. The programme includes various horse fêtes. It is hoped that a number of sportsmen will take part and large numbers are expected from Germany, Austria, Esthonia, Finland, Italy, the Netherlands, Sweden and Turkey.

Cattle.

DEVELOPMENT OF THE HEAD OF CATTLE IN GERMANY. — At the beginning of 1930 the Office of Prices Information of the German Agricultural Council (Preisberichtsstelle beim Deutschen Landwirtschaftsrat) started collecting quarterly statistics of the stock of cattle. The first published results are summarised in the following table, which shows the numerical variations in the different categories during 1930 as percentages of the actual numbers of animals existing on December 15, 1929.

CATEGORY	Head of stock on			
	15 March 1930	15 June 1930	15 September 1930	15 December 1930
<i>Female.</i>	%	%	%	%
Cows	100.4	91.1	97.2	100.4
Heifers over 2 years	104.1	96.8	109.1	93.2
Heifers from 1 to 2 years	99.5	90.7	97.7	97.5
Calves from 3 months to 1 year	95.9	93.9	112.1	102.6
Calves under 3 months	118.7	84.6	62.8	107.7
Total of female stock	101.3	91.7	98.4	99.7
<i>Male.</i>				
Bulls over 2 years	100.0	91.2	93.5	102.5
Oxen over 2 years	93.5	83.1	80.0	82.5
Young bulls and bullocks of from 1 to 2 years	100.2	91.9	87.4	102.1
Calves of from 3 months to 1 year	98.0	101.9	130.5	121.8
Calves under 3 months	134.1	95.2	72.8	138.3
Total of male stock	102.3	91.9	92.9	105.2
Total head of cattle	102.0	87.1	99.0	101.2

THE PROTEIN REQUIREMENT OF DAIRY CATTLE. — Various writers have estimated the protein requirement differently. KELLNER calculated that at least 60 gm of digestible protein are necessary to produce 1 kg. of milk, Nils HANSSON said 45 gm, etc. Prof. ZAITSCHER has carried out a new investigation of the problem in Hungary with the following results:—

(1) When prices of protein-rich foods are not too high 60 gm. of digestible protein may be considered as the minimum limit for the production of 1 kg. of milk.

(2) In farms having available cheap supplies of protein (leguminous crops, wine residues, etc.) up to 70 gm. of digestible protein per kilo of milk should be fed, particularly at the beginning of lactation.

(3) It is not advisable to exceed 70 gm. Excess of protein is liable to produce digestive troubles, affections of the reproductive organs, udder diseases, etc., and no benefit is usually obtained.

(4) On the other hand the protein allowance may be reduced to 50 gm. if prices are particularly high. Some compensation may then be sought in the richness of the starchfoods.

(5) Any reduction in the protein ration must be effected gradually even if the lowest point reached is 60 gm. per kilo of milk. (*Mesőgazdasági Közlemények* (Agricultural Research) 1931, no. 3).

TRAVELLING COURSES IN MILKING AND LIVESTOCK MANAGEMENT IN PRUSSIA. — As a result of the initiative of the Minister of Agriculture, Estates and Forests these courses of instruction have been given for about a year, in the first instance in the high regions with small peasant holdings. They are attended mostly by farmers' wives and families and consist usually of 10 days' theoretical and practical teaching. There are also evening meetings open to all those interested, which are always well attended.

Pigs.

JUGOSLAVIA-BUYS ENGLISH BREEDING PIGS. — According to the *Times* the Yugoslav Ministry of Agriculture has decided to buy on its own account and for 3 provinces and various private individuals Yorkshire breeding stock to a total value of about 4000 pounds sterling.

NUMBER OF PIGS SLAUGHTERED IN GERMANY IN 1930. — During 1930 17,994,355 pigs were slaughtered under compulsory control, as against 17,252,169 in 1929 and 16,406,423 in 1913.

The average weights of all the pigs slaughtered in the country in 1930 were as follows:

	1st quarter	2nd quarter	3rd quarter	4th quarter
German pigs	91 kg	90 kg	90 kg	92 kg
Foreign pigs	161 kg	166 kg	156 kg	159 kg

From these figures it may be calculated that there was a production of controlled pork of 16,369,701 quintals. (*Zeitschrift für Schweinezeitung* 1931, Nr. 9).

Poultry.

CONFERENCE ON LAYING TRIALS AT LEICESTER, JANUARY 1931. — This Conference was called by the Laying Trials Commission of the National Poultry Council for the purpose of introducing a greater degree of uniformity into the presentation of the results of such competitions.

As regards grading of eggs the Conference was unanimous in recognising that the present method of classing the 1st and 2nd grades requires no modification but that the 'Special' grade should be indicated separately and that the limit of weight for an egg of this grade should be 7.34 gm. above the first grade at all stages of the trials.

The Conference recommended the following classification scheme :—

Weight of 1st grade eggs

- 53.13 gm. and over during the first month,
- 54.9 gm. and over during the second month,
- 56.7 gm. during the remainder of the year of trial.

Weight of 2nd grade eggs

Not more than 7.34 gm. below the minimum weight of the 1st grade at all stages of the trials.

Weight of 'Special' grade eggs

Not less than 7.34 gm. above the minimum weight of the 1st grade at all stages of the trials.

The Conference then discussed what consideration should be accorded to 2nd grade eggs in the classification of results in view of the awarding of prizes. It was unanimously decided that the limit should be a maximum of 10 2nd grade eggs per hen and not an average of 10 eggs per hen in each lot.

Regarding the question whether the awarding of prizes should be based on the number of eggs laid or on their cash value or by points there was no unanimous decision, but the majority voted in favour of the system based on the number of eggs laid. It was understood that the Associations for Laying Trials would not be obliged to accept resolutions of the Conference which were not unanimous, so each Association will remain at liberty to decide on the method of awarding prizes.

On a majority vote the Conference recommended that for lots of 4 hens and upwards the awarding of prizes should be based on the selection of the best results in accordance with the following rules :—

- (1) For lots of 4, 5, 6 or 7 hens to base the awards on the 3 or 4 or 5 or 6 best results respectively.
- (2) For lots of over 7 hens to base awards on a number of best results 2 units inferior to the total number of hens in each lot.

Thus though the Conference has not been able to establish complete uniformity it has at least made a considerable step forward in that direction.

EGG PRODUCTION IN SIBERIA. — Under the Soviet system of collective agriculture it is proposed to form 5 large State poultry farms. Two large incubation establishments are already under construction. According to the scheme the farms will during the first years produce 130,000 table poultry and 600,000 eggs per year. (*Die Eierbörse*, Berlin 1931, Nr. 11).

AGRICULTURAL INDUSTRIES

Notes.

Industries of Plant Products.

IRRADIATED FLOUR AND SEMOLINA. — Recent experiments by I. SCHWARZ and F. SIEKE show that irradiated flour and semolina have no antiscorbutic value. Their high price is not justified. (*Münchener Medizinische Wochenschrift*, 1930).

FOOD PASTES CONTAINING PLANT LECITHIN. — Experiments with ordinary pastes or doughs and pastes containing 3.2 kg. of 30 % lecithin per kg. of flour have shown that the latter rise less and more slowly.

The colloids of the lecithin prevent the swelling of the albuminoids of the flour. W. ZIEGELMAYER considers that plant lecithin will serve to strengthen pastes made with soft wheats. (*Kolloid Zeitschrift*, 1930).

WHITE BREAD. — In the *Zeitschrift für das gesamte Getreide- und Mühlewesen* (1931) Prof. K. MOHS discusses the use of bolted flours for baking. He is in favour of their use except where whole meal is necessary for dietetic foods. The superiority of bread made with whole meal is negligible as regards its vitamin content, because both white and whole meal bread are too poor in vitamin B to supply human requirements. Fortunately human foods are varied and largely compensate one another.

In any case vitamin deficiency cannot be set right by substituting whole meal bread for white bread and he sees no reason to return after four centuries to its universal use.

TINNED FOOD FACTORIES IN ITALY. — Numbers I and II of *Le Conserve Alimentari* for 1931 contain a list of the factories for tinning plant foods established in Italy on 31 December 1930. They are classified in regions, provinces and communes and number 608 firms.

EFFECT OF DRYING AND SULPHURING ON VITAMIN C. CONTENT OF PRUNES AND APRICOTS. — Frozen fresh prunes retain their vitamin C satisfactorily, but frozen fresh apricots packed in cases which were not evacuated, lost this property. When packed in cases evacuated and filled with nitrogen before the fruit was frozen, they retained the vitamin. The difference is ascribed to retention of respiratory tissue oxygen in the evacuated lot.

Sulphured, dehydrated and sundried prune products retained the vitamin C of the fresh fruit only when the fruit was dipped in lye in the usual commercial fashion before the SO₂ treatment, because of the better penetration by the protecting SO₂ after dipping. All unsulphured prune and apricot products are without antiscorbutic value. The dehydrated products, both prune and apricot, retain the vitamin C more completely than does the corresponding sundried fruit.

The dehydrated and sundried apricots containing 450 to 500 or more parts of SO₂ per million retain their antiscorbutic property more or less completely. With less than this amount all products lost this property completely. The vitamin C content was determined by the method of FAY MORGAN, FIELD and NICHOLS. (*Journal of Agricultural Research*, January 1931).

NEW ALLOY FOR PRESERVED FOOD CONTAINERS. — In the United States a new alloy of chromium and nickel has been obtained which has the trade name of Allenghi's metal. It does not deteriorate or stain and is intended for use in the manufacture of containers for preserved foods for export. It will also be used in the dairy industry and is recommended for the most varied uses. (*Rivista Italo-Americana*, 1931).

OIL OF *Wrightia annamensis*. — The oil of the 'cay thu muc' (*Wrightia annamensis*) belonging to the Apocynaceae, is comparable with castor oil.

Composition of the seeds: — water 5.8 % — fats (extracted with petrol ether) 36.1 % — crude cellulose 5.1 % — non-nitrogenous extractives 19.6 % — ash 4.3 % (containing Al₂O₃ 50.6 %, K₂O 10.7 %, P₂O₅ 11.2 %, SiO₂ 19.1 %). Specific weight

at 20°C = 0.966. Coefficient of viscosity at 20° C. G. S. = 676. The variation in viscosity with change of temperature gives a curve very similar to that for castor oil.

Wrightia oil is red, is soluble in alcohol at 95° like castor oil and is not siccative. Its principal constituent is an oxyoleic acid probably identical with ricinoleic acid. It polymerises like castor oil and gives similar composites with sulphur chloride. Soaps made with Wrightia oil have the same properties as those of castor oil. (*Comptes rendus de l'Académie des Sciences*, Paris 1931, no. 6).

INDUSTRIAL PRODUCTION OF CITRIC ACID BY FERMENTATION. — Citric acid from fermentation is now produced on a commercial basis in the United States, Great Britain and Belgium. According to *Commerce Reports* (No. 40) for October 1930 there is only a single firm producing it in the United States. In England Messrs. ROWNTREE & Co. at York use the FERNBACH process. In Belgium the firm TIRLEMONT & Cie has experimented with the production of citric acid from saccharose. In 1928 350 tons of citric acid from fermentation was produced in Belgium. (A large proportion of the shares in the Belgium firm are in the hands of the Italian firm of ARENELLA). In 1929 a large plant for the production of citric acid from molasses was built in Germany.

The investigations of Dr. A. FREY of the 'Technische Hochschule' of Munich on the possibility of using as raw material a 4 % sugar solution obtained from sawdust by the SCHOLLER-TORNESCH process, is of interest. In optimum conditions, writes the *Industrie Chimique* (no. 206, March 1931), a yield of citric acid of only 16 % of the weight of the sugar was obtained, whereas with cane or beet sugar or even with molasses a yield of 30 to 40 % can be obtained.

Industries of Animal Products.

ANALYSIS OF FATS AND PORK BUTCHERY PRODUCTS BY FILTERED ULTRAVIOLET RAYS. — Prof. LENFELD carried out comparative trials of analysis with filtered ultra-violet light produced by a HANAU quartz lamp and a MÜLLER arc lamp and obtained the following results.

(1) To determine the quality of fats and pork butchery products the freshly cut surfaces should be examined in daylight and in ultraviolet light produced by special analytical lamps.

(2) The HANAU analytical quartz lamp gives valuable indications with regard to foreign fats.

(3) The MÜLLER lamp gives an entirely different image from the HANAU lamp.

(4) Age and rancidity of fats are shown by variation in colour and by a violet fluorescence in ultraviolet light.

(5) Analysis of ether or glycerine dissolved fats shows no advantage over that in the solid state with the HANAU lamp. (*Zeitschrift für Fleisch- und Milchhygiene*, 1931).

IODINE CONTENT OF THE PRINCIPAL NORWEGIAN FISH. — The following table shows the iodine content in millionths.

	Iodine content of the fresh fish	Iodine content of the dried fish
Haddock	6.23	29.34
Cod	5.17	24.55
Mackerel	0.45	1.75
Herring	0.17	0.52
Salmon	0.25	0.50

The fleshy parts are richer in iodine than the thin parts of the same fish, but the well-fleshed kinds of fish are poor in iodine in comparison with the thin type.

The iodine content is evidently dependent on the food because it is greater in the intestines than in the muscle. Drying fish causes them to lose $\frac{2}{3}$ of their iodine content. Fresh fish contain more iodine than tinned fish. Fishmeal made from fleshy herrings is richer in iodine than when made from poor herrings. (*Zeitschrift für Fleisch- und Milchhygiene*, 1931).

THE CORBLIN DAIRY HOMOGENISER. — The homogeniser of H. CORBLIN is based on a new principle and reduces to a third or even to a quarter the pressure required by the machines used hitherto (about 200 kg. per sq. cm.).

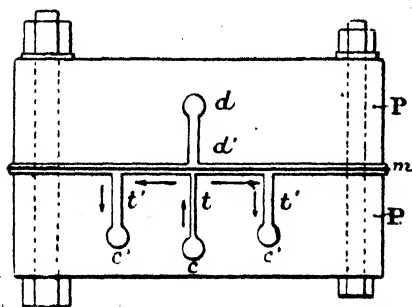


Diagram of the Corblin dairy homogeniser.

ings t' and the globules are broken up. (*Le Génie Civil*, Paris 1931, no. 13, p. 325).

THE PROTH OF MILK. — Research carried out by W. MOHR and C. BROCKMANN (*Milchwirtschaftliche Forschungen*, Berlin 1930, Band 11, Heft 1-2, pp. 48-61) shows that milks which form the most stable and stiff froths have usually the highest surface tension and viscosity and thus are the most suited for the preparation of whipped cream and ice cream. On the other hand a strong tendency to frothing is often a drawback; the addition of sodium citrate makes the froth less stable.

The writers find that there is an optimum surface viscosity for a stable froth. When the fat is liquid more froth is formed than when it is solid. The higher the fat content of the milk the lower is the quantity and stability of the froth. With increasing acidity of the milk there is first a reduction and then a slight increase in frothing.

Homogenisation of skim milk reduces frothing, but homogenisation of the fat increases it. The influence of temperature on frothing varies in different milks; the optimum is between 30° and 60° C.

Repeated production of frothing tends to increase it. Churning of whole milk considerably lowers the frothing of the skim milk produced.

SALTY MILK. — A salty flavour, which is caused by over-working the cow, is an indication of considerable modification in the total composition of the milk, as has been shown by J. PROKS (*Le Lait*, Paris 1931, no. 104). There is a reduction in the content of lactose and solids non-fat, an increase in the content of ash and albuminoids, and the most striking change is the large increase in the chlorine content. Calcium, magnesium and phosphorus are also in abnormal proportions.

IRON CONTENT OF MILK. — The iron content of human, cows', asses' and goats' milk is practically the same; it may reach or even slightly exceed 1 mg. a litre, but usually is below this figure. (*Le Lait*, Paris 1931, no. 104).

WHITE AND BLUE MOULDS IN CAMEMBERT CHEESE. — The two moulds of Camembert are *Penicillium Camemberti* (blue) and *Penicillium Camemberti* var. *Rogeri* (white); they are morphologically identical but the white grows more quickly than the blue and is stronger and more resistant. Both take direct part in maturation and produce the characteristic flavour. The aroma however depends also on the presence of a special strain of *Oidium lactis*. (*Zentralblatt für Bakteriologie, Parasitenkunde und Infektionskrankheiten*, 1930).

MANUFACTURE OF ST. NECTAIRE CHEESE. — The St. Nectaire is a flat cheese, 25 cm. in diameter, 5 to 6 cm. thick, without holes, of an agreeable flavour, free from bitterness. It is made mainly with the milk of the Salers and Ferandaise cattle. The first phase

of the process differs little from that of Cantal cheese. After the coagulation and agglomeration of the curd it is pressed in a primitive hand mill. C. MATHIEU and R. PLANCHET in *Le Lait* (Paris 1931, no. 105) describe the farm process of making the cheese, its defects and diseases and the modification of the technique for industrial production.

Less milk is required than for Cantal cheese : 100 litres of milk give 11 to 14 kg. of St. Nectaire according to the richness of the milk and the season ; 12 to 18 litres are needed to make about 1.7 kg. of the cheese. The St. Nectaire ripens more readily than the Bleu d'Auvergne.

H. G. & G. S.

FORESTRY

Recent Research Work on the Root Systems of Forest Trees.

For a long time past forestry experts have been studying the physical requirements of tree roots and their importance in the life of the forest has been fully recognised. At the same time attention has been drawn only through the results of quite recent research work, to many aspects of the life of the underground parts of tree which are of great practical value to forest workers.

The various kinds of forest trees have long been classified as trees with deep or trees with superficial roots, and also according to the extent of their root systems in which various categories are distinguished. It is however well known to-day, following on recent experiments, that the variations in the root system of the same kind of tree are often greater in different soils than those of different kinds of trees in the same type of soil. In this way also it is possible to explain how it is that the classification of trees by various writers on the subject almost invariably shows differences due undoubtedly to local conditions and to the quality of the soil under the influences of which the classifications were made. No longer is the development of the roots, whether healthy or otherwise, considered as a matter for which the tree itself is in the main responsible but as due in the first place to the composition of the soil and subsoil, the abundance of nutritive material in the soil, its porous character, to the abundance or shortage of water in the deep beds and only, after all these, on the tree itself.

At the present time after taking account of all the earlier knowledge acquired on the subject it is generally admitted that in any research work on the root systems of forest trees, special importance from the practical standpoint should be assigned to information obtained regarding (1) competition between root systems and (2) the possibility of the adaptation of roots to changes in conditions such as may occur during the life of the trees.

It has been made evident for some time past that any competition between the roots of herbaceous plants is considerably less than is the case with tree roots on account of the different levels of the roots. In the past progress in experimental work on the root systems of forest trees has been very slow as a result of its high cost and also of material difficulties, more particularly in the case of trees which are already of considerable age. Even quite recent literature has been mainly concerned with reporting on the development of the roots of plants grown in nurseries and on the damage attributed to the mutilation of the roots of lifted plants. Recent research work has already provided useful information on (1) the competition between the roots in stands of trees of the same age, (2) that between the roots of trees of different ages and sizes in the same stands and (3) the competition between the roots in pure and mixed stands in different soil conditions.

M. LAITAKARI of Finland has made tests of stands of Scots pine of equal and

of different ages respectively and noted that the average depth of the horizontal roots in this case increases with the age. His conclusion is that root competition, which mainly affects the horizontal roots and is, as is well known, less important for the vertical, is less marked in stands where age and size differ than in stands of trees of equal age. He observed that the horizontal roots of the birch and Scots pine were of similar depth though deeper than that of the spruce. Hence he is of opinion that a mixture of Scots pine or birch with spruce involves very little root competition and that a young undergrowth of spruce beneath mature Scots pines or birch provides a combination in which the competition factor is negligible.

In the past the question of satisfying light requirement has loomed too large in tree physiology. Without any consideration of the roots attention was drawn to the mischief resulting from the shade of neighbouring trees. As regards the competition of root systems, speaking generally, attention was confined to the influence of the older trees on the trees in the undergrowth. In addition the experiments made by M. MAGYAR of Hungary show that root competition is to be found in young stands of trees of equal age. He planted on alkaline soil rows of *Populus canadensis* between rows of *Sophora japonica* and rows of *Eleagnus angustifolia*. The Canadian poplars between the rows of *Eleagnus* were much retarded in development as compared with the poplars between the rows of *Sophora* but it was not possible that any ill effect could have been produced by shading inasmuch as the upper parts of the rows were still partly open.

An explanation of this state of affairs was supplied by an investigation of the roots. The poplars in the neighbourhood of the lightly rooted *Sophora* specimens had developed a strong and sound root system and were growing well while the rooting and growth of the poplars between the rows of *Eleagnus* were much weaker. This was due to the fact that the roots of the last named trees had branched freely and had pierced the soil in all directions, appearing even below the roots of the poplars. Cases have occurred where a strong growing tree such as *Populus canadensis* has been driven out by a slow growing tree such as *Eleagnus angustifolia*. M. MAGYAR has also observed an instance where *Ulmus campestris* had destroyed *Maclura aurantiaca* through root competition although the crowns had not yet closed over.

In young plantations, giving adequate room for growth or having moisture and a sufficiency of nutritive material available for the roots in the soil, root competition does not exist. As soon however as the roots begin to fall short of their requirements the stronger individual takes advantages of its power and when it finds space available among the roots of its neighbour, very quickly destroys the roots of a weaker subject. Thus the visible destruction of the aerial parts of trees is already preceded by a destruction of the roots so that the former condition is a consequence of the last named.

M. LAITAKARI has also made a study of the competition between tree roots and the roots of ordinary soil growths, such as bushes, plants and grasses. This rivalry is mainly to be found in the upper layers of the soil but it also occurs at lower levels. It may be controlled by burning, harrowing, ploughing, etc. the best means of all being the establishment of a suitable undergrowth. Whatever be the method chosen, it is necessary to have a good knowledge of the root life so as to avoid damage to the growing trees as the result of the firing, ploughing, etc. Even though there is a general belief that e. g., Scots pine roots are very little harmed by surface burning, M. LAITAKARI notes that fire damage may at times be so serious that the maintenance of the stands no longer pays and it becomes advisable to fell and proceed by way of natural regeneration.

In addition to a knowledge of the question of root competition it is also very important to be acquainted with the capacity of the roots of the various kinds of trees to adapt themselves to local conditions and to changes therein during the life time of the trees. Recent experimental work shows how far the different kinds of trees possess the capacity to produce, according to the requirements of the case, new roots, both horizontal and vertical, to make good the loss of the original roots.

In connection with the development of vertical roots it is to be noted that trees show a remarkable capacity, in relatively dry soils, of adaptation to the depth of the subsoil water. Where this water is situated at a considerable depth, all kinds of trees very quickly develop long vertical roots so that they can pass through the drier soil levels and reach the water table in the subsoil. Trees show however a marked tendency to retain any special characteristics of their type and hence M. MAGYAR is of opinion that the problem of afforesting rough and extensive tracts of alkaline soils is purely a question of roots and can only be solved by utilising trees of which the root systems are able to penetrate to the subsoil waters through the alkaline upper surface which is only to a very slight degree permeable by rain water. The results of M. MAGYAR's researches and root tests have enabled him to draw up provisionally the following descending scale for various types of trees according to their capacity for the rapid production of roots in alkaline soils: 1. *Tamarix tetrandra*, *Eleagnus angustifolia* — 2. *Tamarix odessana*, *Pyrus Pyraister*, *Amorpha fruticosa* — 3. *Ulmus glabra*, *U. laevis*, *Quercus Robur*, *Sophora japonica* — 4. *Fraxinus americana*, *F. excelsior*, *Populus virginiana*, *P. alba*, *Acer Negundo*.

M. WIEDMANN of Germany has observed that a stand of Scots pine, which originally only produced superficial roots in a very wet soil, at a later stage, when the soil has become drier as a result of the development of the roots of the trees forming the stand, grew very deep vertical roots. He has also noted that spruce, which is known as a species with a superficial root system, will produce deep roots where demanded by circumstances. According to MAGYAR as regards horizontal roots, the possibility of root adaptation to conditions, may well explain the fact that in rich soils the horizontal root system is closer and more branching but with a total length in proportion to the size of the tree-crown which is less than that of the roots in individual cases on poorer soils.

When young specimens are planted out, an opportunity is provided for judging capacity for rapid root adaptation to changed conditions. On this subject the observations of M. BURGER of Switzerland deserve special mention. Young specimens of spruce which had been planted too deeply in the nursery formed lateral roots, by way of accommodation to environment at a point in the stem five centimetres higher than the original lateral roots. When the same specimens were again replanted at an excessive depth in their permanent home in the forest, the original roots gradually wasted away for the second time and lateral roots sprouted again at a still higher point.

WIEDMANN quotes as an example to prove the adaptability of spruce that in certain cases specimens, which had been over deeply planted, grew lateral roots pointing in an upward direction.

This adaptability of root systems observed on planting out, nullifies the old view that the young plants, especially in the case of certain species, should invariably be replanted with all their roots and unmutilated, which is very often a practical impossibility. MAGYAR shows that, in planting out, seedlings lose 50-66 % of their original roots if planted at the age of one year, 50-80 % if planted when two years old, while rooted cuttings lose from 75-90 %. This practically almost inevitable mutilation of the roots does not as a rule, thanks to their capacity for

accommodating themselves to changes in conditions, have any serious results on the health of the plants. Naturally however the wounds resulting from the mutilation of the roots or from the perishing of old roots after planting out may, unless they scar over quickly, readily become a breeding ground for cryptogamic disease.

If the change in living conditions takes place when the trees are mature, the roots quickly accommodate themselves. In this connection reference should be made to the adventitious roots which may spring not only in the root system but also on the trunk and other parts of trees as circumstances may require. In the past these roots were considered solely from the point of view of propagation by cuttings.

M. NÄGELI of Switzerland describes the behaviour of older trees of various kinds planted for five years at a depth of 120 cm. In most cases the underground portion of the trunk and the original root systems were not materially affected by the change in conditions. Nearly all the trees put out new adventitious roots, but the different kinds of trees showed remarkable variations in this regard. Some of them, including larches, beech and oak produced relatively strong roots on the subterranean part of the trunk, especially at the lenticels, in place of former branches, at points of wounding, etc. at a considerable depth below the new soil level. Other trees, such as the Austrian pine and cherry, produced adventitious roots on the original roots themselves with a tendency in the new soil to grow upwards. These new roots springing from the original root system or from the subterranean part of the trunk are not morphologically distinguishable from the original roots. An exception however must be made for the beech as in this case the adventitious roots are always fibrous and very slight, serving merely to absorb moisture and making no contribution either to the stability of the tree or to the general development of the root system. His own personal observations and those of M. FLURY, another Swiss expert, have caused M. NÄGELI to make the following classification for the kinds of tree tested according to their capacity for producing adventitious roots on the trunk: (1) trees with high capacity: oak sycamore, white elm, larch, spruce; (2) trees with moderate capacity: beech, Norway maple; (3) trees with little or no capacity: ash, cherry, Austrian pine, fir. M. NÄGELI however adds that this classification should only be generally accepted for the various soils with a certain reserve. He has also made a note of the time required after planting for the formation of new roots. Those which produce roots most rapidly are the spruce, maple and elm which grew new roots during the actual year of planting; on the other hand the larch grew its new roots one year later and the oak and the beech only after the expiry of two years.

The importance of a knowledge of adventitious roots is clearly shown when the surface of the soil is raised above the original level during the period of the life of the stand as the result of external causes. The following are cases in point: (1) the construction of forest roads or embankments which may cover up living trunks; (2) the earthing up of the trunks to a certain depth by the debris carried by torrents, etc. etc.

Mention should be made in conclusion of a further instance of root adaptation to changed conditions. Trees used for purposes of regeneration are able to utilise to their own advantage the roots of the trees of the former stand still left in the ground. The component elements in the new generation readily drive their taproots at points where decaying roots or the gaps left by them occur. Hence LAITAKARI recommends that there should be no grubbing up after felling, especially in sandy soils and that restocking should take place quite quickly after the cut before the roots and stumps decay and the gaps are blocked up.

LATTAKARI also recommends that the old roots should be left in the ground, since it is often the case that the roots of different trees interlace and grow together. Even without taking into account the fact that this conjunction of roots undoubtedly strengthens the resistance of the trees to the force of the winds, it is a very important point that the roots of a felled tree can continue to live and to nourish a neighbouring and still living tree with the roots of which they are in contact.

G. LUNCZ.

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Notes.

- INTERNATIONAL CONGRESS OF TIMBER AND FORESTRY, PARIS, 1-5 July, 1931. — The programme of this Congress is the following:—
- 1 July. — Morning Opening Meeting of the Congress under the Presidency of the Minister of Agriculture. — Afternoon: Work of the Commissions — Official Reception of the members of the Congress.
 - 2 July. — Morning and afternoon: Work of the Commissions.
 - 3 July. — Excursion to Le Havre; visit to the port; reception of the members of the Congress by the Port Authorities.
 - 4 July. — Morning and afternoon: Work of the Commissions.
 - 5 July. — Morning: Closing session — Afternoon: Reception at the Palace of Timber and visit to the Colonial Exhibition — Evening: Banquet to the members of the Congress.
- From Monday 6 July: Week's excursion in motor-cars to the most beautiful parts of the Alps, including Savoy, Dauphiné and Provence; the number of places is limited.

Programme of the Congress.

GROUP I: Tropical and Sub-Tropical Timber.

- 1st Section: Forestry and Technology.
- 2nd Section: Production.
- 3rd Section: Transport.
- 4th Section: Trade.
- 5th Section: Modes of utilisation.

GROUP II : Forestry, Science of Forestry and Forest Pathology.

- 1st Section : Forestry science, silviculture, forestry economics and legislation.
- 2nd Section : Mediterranean problems.
- 3rd Section : Re-afforestation, large scale forestry undertakings.
- 4th Section : Private forest lands, fiscal questions and control of forest fires.
- 5th Section : Forest pathology.

GROUP III : Timber trade and industry. International questions.

- 1st Section : Fellings.
- 2nd Section : Transport.
- 3rd Section : International questions.
- 4th Section : Modes of utilising different kinds of timber.
- 5th Section : Furniture trade.
- 6th Section : Workers' legislation and protection against accidents.

GROUP IV : Technical Instruction.

- 1st Section : Technical instruction in methods of forest exploitation, including felling, barking, unloading and timber measuring.
- 2nd Section : Technical instruction in the conversion of timber, including sawing, cutting up, veneer cutting, etc.
- 3rd Section : Technical instruction in the timber industries including timber working, joinery and parquet work, cabinet making, coach-building, making of musical instruments, cooperage, wooden toy making, chair making.
- 4th Section : Technical instruction in the industries depending on timber, including paper making, resin making, the preparation of charcoal and distillation.

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(1) Previous list January 1930. The list will continue in the following numbers.

(2) List of abbreviations: bimeas. (twice monthly), bimestr. (two monthly), hebd. (weekly), int. (price for the interior), étr. (foreign countries); irr. (irregular), mens. (monthly), N. S. (new series), sem. (half yearly), trim. (quarterly), v. (volume).

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OF PLANT PROTECTION

DISCOVERIES AND CURRENT EVENTS *

French West Africa : Latest Locust Invasions and Locust Control in the Colonies of Dahomey, Upper Volta and Senegal (1).

Dahomey. — Locusts appeared in the ' Cercles ' of Dahomey in December 1929 ; the first swarm was reported near Allada in the regions of Tori and Niaouli on 5 December. Since then they have never ceased circulating in the interior of the Colony. The table below gives details of the swarms and the directions taken by them.

All the swarms were composed of yellow locusts. Towards 24 April masses of pink locusts were reported in the region of Bohicon at Savé. Some of the swarms merely crossed certain Cercles, staying only a few minutes and then going towards the frontiers of Nigeria, Togoland or towards the north of the Colony. On the other hand in some regions great masses of the insects settled and remained causing serious damage, specially to the maize fields, which in some Cercles were completely destroyed. The damage was worst in December because the natives sowed late after the floods on the low parts had subsided.

The most important migrations were in the dry season and the direction was influenced by the winds.

The breeding ground in Dahomey has not been discovered ; the passage of young pink locusts was merely noted, as is mentioned above, in the regions of Bohicon at Savé.

In consequence of the enormous damage by locusts in December a serious campaign was undertaken.

Instructions were given to all the Cercles to keep constantly in touch with each other so as to enable the available methods of control to be got into action as rapidly as possible. The communication consisted in telegraphic notification of locust flights to all the Administrators, signalling rapidly from village to village the observations made at a given point. The Commandants of the frontier Cercles also were instructed by circular to warn the Administrators of the nearest divisions of neighbouring Colonies (including foreign ones) by the most direct method.

In addition to these measures of a general nature which enabled neighbouring territories to be warned of the arrival of swarms and to take the necessary steps for their destruction, a local Decree was issued in April 1930 which ordered the inhabitants of invaded territory to make in turn a daily beat to ascertain where the locusts were

* In this, as in the next chapter, the countries are arranged in French alphabetical order.

(1) Communication from the General Government of French West Africa, official correspondent of the Institute.

Dates of appearance of swarms	Places passed	Direction
5 December 1929	'Cercle' Allada (Tori-Niaouli).	
5 "	" Grand-Popo (Canton Adja)	North
6 "	" "	"
6 "	" Allada	South
9 "	" Moyen Niger (vallée Mékrou)	North and South
9 "	" Holli-Kétou (Hollidjé)	South
10 "	" Zagnanado	"
10 "	" Savalou (Tchatti)	North West
11 "	" Zagnanado (Cantons Cové, Banamé, Dovi).	Abomey
14 "	" Porto-Novo	Holli-Kétou
14 "	" Holli-Kétou (Kétou-Hollidjé)	"
16 "	" Allada (région Couffo)	North
17 "	" Abomey (région Cana)	"
18 "	" Grand-Popo (Subdivision Popa)	"
19 "	" " (Locossa and Athiéme)	"
19 "	" Allada	South
21 "	" Holli-Kétou (Pobé)	Porto-Novo
4 January 1930	" Savalou (Canton de Mahi)	"
6 "	" Savalou (route Tchatti)	North
8 "	" " (Subdivision Savé)	Nigeria
9 "	" " (région Banté)	North East
12 "	" Savalou	South
15 "	" Grand-Popo (Subdivisions Athiéme and Bopa).	West
20 "	" Allada	North East
22 "	" Zagnanado	West
24 "	" Savalou (Subdivision Savé)	"
24 "	" " (région Dassa)	"
26 "	" " Abomey	East
18 February 1930	" Djougou (route N°Daly)	North
7 March 1930	" Djougou	North West
7 "	" Savalou (Cantons de Mahi, Savalou, Djalonkou Dassa, Savé)	"
23 "	" Savalou (Subdivision Savé)	West
1 April 1930	" Porto-Novo (Subdivision Adjohou)	South
14 "	" Allada (région Agbanon)	East
24 "	" Abomey and Savalou (Bohicon-Savé)	"
9 May 1930	" Savalou (région Djalonkou)	West
21 "	" Allada (région Dodji)	East
21 "	" Grand-Popo (Subdivision Bopa)	"
22 "	" Holli-Kétou	North East
22 "	" Grand-Popo (région Konoukou)	North West
23 "	" Moyen-Niger (Kandi)	North
24 "	" Moyen Niger (Guéné)	North East
26 "	" Allada	"
27 "	" Moyen-Niger (Guéné)	West
2 June 1930	" Moyen-Niger (Kandi)	South East
9 "	" Porto-Novo (Subdivision Adjohou)	North

alighting to breed. Various other measures were also prescribed, such as, catching hoppers, burying the bodies, destroying eggs, prohibiting the killing of insectivorous birds, etc.

Prizes were promised to all persons bringing a certain number of dead hoppers.

At the beginning of the campaign one was constantly coming up against the prejudices of the natives who always seek a supernatural cause for the simplest facts and start looking for new fetishes to deal with the evil.

But in view of the very serious risk to crops constituted by the masses of locusts reported in the different regions the various instructions were put into practice: the villages fought against the scourge, numerous gangs were organised and considerable quantities of hoppers destroyed.

The beginning of the rainy season seems to have freed the Bas-Dahomey from the locust invasions. But unfortunately they continued to be reported in the northern Cercles where the rain storms were less heavy and less frequent.

On 17 July 1930 a cloud of locusts was reported above Parakou. Control was actively carried out in combination with the neighbouring Colonies.

Upper Volta. — In consequence of irregular rainfall in the early winter the sowing of food crops was begun in unfavourable conditions and was some-

what seriously retarded. Later however the rainfall became more abundant and better distributed and the sowing was able to be undertaken afresh and carried out without any hindrance.

The original doubtful situation was thus apparently remedied and the sprouting, which was in general normal, was making it possible to hope to retrieve the lost time when a number of locust swarms spread themselves over the whole territory, causing serious damage to the large and small millets.

The most affected Cercles were Dédougou, Koudougou, Kaya and Ouagadougou, where there was much locust damage, necessitating resowing.

The present locust invasion seems to be of local origin and to result from hatching of eggs laid by swarms coming from the frontier regions into the Colony during the last quarter of 1929.

Information gathered in the different Cercles in fact reports the appearance of adults and hoppers at approximately the same dates.

On the other hand, hoppers hatched in certain regions are already in full flight while in others they are still at the moulting stage.

In spite of the efforts at control being displayed up to the present time in all the affected regions they are unable owing to their quite recent organisation to give satisfactory results as yet.

Even if it has been possible in certain places to reduce the size of the swarms of adults or hoppers the danger is far from having been warded off and the risk of invasion persists.

There is need, it is true, to bear in mind that the task is difficult and that economic and genuinely effective methods are lacking when it is a matter of reaching winged locusts.

Flame throwers and the Herell process do not as yet appear to have protected the countries which have employed these methods which are particularly costly and require much skilled labour, which it would be difficult to find in this Colony.

The only control method which is now recommended is the systematic search for breeding grounds and the collection of eggs. This is in all cases concerning the inhabitants and finances of the Colony the only practical method.

Instructions to this end are already in preparation and a plan is in course of organisation which will make the existing campaign against invading locusts more methodical and will ensure a more effective protection of crops.

S e n e g a l . — The presence of locusts was reported in the Cercles of Tambacounda, Kédougou and Bakel. Some swarms passed through the Kaolack district, but without causing serious damage.

The inhabitants of the Colony are aware of the danger to their crops and help and collaborate in the control measures carried out under the direction of the Administration to keep off and kill locusts.

In the Cercles of Tambacounda and Kédougou defence gangs formed by the Cercle police have been organised and work actively at locust destruction. The work is directed by the Commandants of the Cercles.

As soon as a place where hatching is occurring is located the gangs go there early in the morning and beat the hoppers with branches while they are still numb with cold. Those which have not been crushed attempt to scatter but are at once collected and thrown into previously dug trenches, covered in with soil and stamped on.

Considerable quantities of hoppers have been destroyed in this way within the boundaries of Tambacounda and thus numbers of locust swarms avoided.

The evil seems to be checked for the moment in Tambacounda ; there is no lon-

ger reason to fear the arrival of swarms from the Sudan or neighbouring regions. According to information from local natives the hatching centre is in southern Boudou, Cercle of Bakel.

Algeria: Pink Bollworm of Cotton (1).

Preliminary results of an enquiry now in progress enables it to be stated that the pink bollworm (*Gelechia* [*Platyedra*] *gossypiella*) occurs in all the cotton growing regions of Algeria. Contrary to what had been thought up to the last few weeks it is found in the Orléansville district, the percentage of infested bolls being often very high. Infestation seems up to the present less serious in Mostaganem. In the Oran district the most serious centres of infection are found; the bollworm occurs in all parts, but the situation is most grave at Perrégaux and St Denis-du-Sig, where it may be said that practically all the plantations are infested. The amount of contamination varies however, not only from one estate to another but even in adjacent plots of one estate; if it is insignificant or low (2 to 5 %) in certain plots it may be very high in others, up to 30 and 40 % of infected bolls having been recorded early in October.

Arrangements have been made for the strict application of the measures ordered by the Prefectorial Decrees of 28 and 31 March 1930, viz., the burning immediately after picking, or at latest before 15 January, of all plants left in the fields and the disinfection of seed. The latter as a result of an agreement between the Administration and the ginners will be carried out at one station, which will be at Oran, by means of hydrocyanic gas and will be under the direct control of officials of the Service for Plant Protection. The tanks already installed allow of the treatment of 30 tons a day.

The use of luminous snares was considered, but as their effect is still much disputed the Administration decided not to prescribe them formally until they have been tested at the Experimental Farm at Ferme-Blanche, near Perrégaux. At this station on 17 and 18 September when the moths were only beginning to emerge 7 acetylene lamps snared 23 and 75 moths, then when more were emerging the figures in the fortnight between 19 September and 4 October reached 1834, or 17.46 moths per lamp per day, distributed as follows:

19 September 1930	100
20 "	95
21 "	151
22 "	lamps not lighted.
23 "	85
24 "	106
25 "	137
26 "	128
27 "	126
28 "	196
29 "	147
30 "	135

(1) Communication from the official correspondent of the Institute, Mr. DELASSUS, Inspecteur de la Défense des Cultures, Algiers.

1	October 1930	136
2	"	99
3	"	137
4	"	56

The number taken would certainly have been higher if the snare used (an acetylene lamp above a tank containing water and petrol) could have been replaced by the type used for the last year in certain factories in Algiers for the control of the cigarette-beetle (*Lasioderma serricornis*); this consists of paper glued on both sides and fixed on a framework arranged round a light.

Other observations have also been made at Perrégaux. It has been noticed in particular that the snares should not be lighted only in the evening, the takings at dawn often being greater. It was found on the other hand that acetylene had sufficient power of attraction and that it did not appear necessary to use blue screens, as recommended by certain writers.

The attack of the pink bollworm is thus general in Algeria, although varying in intensity in different regions, but the rigorous application of the prescribed control measures may allow of a considerable reduction in damage.

Cyrenaica : Insect Pests (1).

During the three months July-September 1930 the following plant pests were found in Cyrenaica :—

(1) *Apate monachus* F. Numerous examples of the adult form of this beetle (fam. *Bostrychidae*) in the trunks of *Melia Azedarach* in the Royal Nurseries of Benghazi. The attacked trees were cut down and buried.

(2) *Opatroides punctulatus* Rtrr. Already reported as injurious to vines (cf. this *Bull.*, Year IV, No. 10, p. 146), attacked the bark of mulberry trees also during the summer. In the nurseries of the Agricultural Section of Barce for the control of this beetle a mixture of 500 gr. of 'Urania' and 100 kg. of bran were spread round the plants, with excellent results.

(3) *Aegosoma scabricorne* Scop. Dead females and large larvae of this beetle (fam. *Cerambycidae*) in the branches and trunks of apricot trees in the oasis of Derna. Winter pruning has been recommended in addition to the complete removal of the most badly affected trees.

United States of America : Outstanding Entomological Features (2).

The present notes refer to August, 1930.

The serious grasshopper conditions reported last month continued during August and particularly serious outbreaks occurred in Idaho and northern Utah.

The pale western cutworm (*Porosagrotis orthogonia* Morr.) was reported as lo-

(1) Communication from the official correspondent of the Institute, Mr. G. KRUGER, Director of the Entomological Laboratory of the R. Ufficio per i Servizi Agrari della Cirenaica, Benghazi.

(2) Communication from the official correspondent of the Institute, Mr. J. A. HYSLOP, Senior Entomologist in Charge, Insect Pest Survey, Bureau of Entomology, United States Department of Agriculture, Washington, D. C.

cally serious in Utah, and the Bertha armyworm (*Barathra configurata* Walk.) was reported in outbreak numbers in the northeastern corner of North Dakota, during August.

The periodical outbreak of the white-lined sphinx (*Celerio lineata* Fab.) reported from Nevada extended westward into the Lake Tahoe region of California.

The dry-weather conditions of July extended through August and, as was to be expected, damage by the red spider (*Tetranychus telarius* L.) continued throughout the month.

The Hessian fly (*Phytophaga destructor* Say) infestation in New York State as a whole is light, averaging for the State 3.7 per cent. In southeastern Nebraska about 80 per cent. of the puparia were dead by the last of July, largely as a result of the hot, dry weather.

The fall armyworm (*Laphygma frugiperda* S. & A.) continued its depredations during August throughout the Gulf Region.

Very severe damage by several species of corn root worms is reported from southwestern Nebraska ; *Diabrotica virgifera* Lec. was the most destructive species. A species heretofore of practically no economic importance, *D. filicornis* Horn was also seriously numerous.

The velvetbean caterpillar (*Anticarsia gemmatilis* Hbn.) is again appearing in the unusually high summer temperatures, and severe late injury is reported from the entire drought area.

The oriental fruit moth (*Laspeyresia molesta* Busck) is apparently not unusually abundant throughout the New England and Middle Atlantic States ; in fact twig infestation has been lighter than usual over much of this territory. This condition extends southward to Georgia and westward to Indiana.

The plum curculio (*Conotrachelus nenuphar* Hbst.) seems to be unusually abundant throughout the Northern States and at a very low ebb in the South.

The citrus whitefly (*Dialeurodes citri* Ashm.) and the citrus rust mite (*Eriophyes oleivorus* Ashm.) have been more troublesome than usual in Florida. This is believed to be due to the dry weather inhibiting the development of entomogenous fungi.

Blister beetles are generally prevalent and destructive throughout the East-central and North-central States.

The asparagus beetle (*Crioceris asparagi* L.) is definitely recorded for the first time from southern California. The pest has been more or less serious throughout central California for a number of years.

In Massachusetts the Mexican bean beetle (*Epilachna corrupta* Muls.) has been found to be well distributed over the Connecticut Valley region of Hampden County and northward into Hampshire County. The pest has also been found in a few instances in Franklin County. In the older infested States in the drought area the insect was reduced to a negligible factor by the high temperatures.

Tobacco hornworms (*Protoparce* spp.) are very decidedly less abundant than usual in the Tennessee tobacco-growing districts.

The saddled prominent (*Heterocampa guttivitta* Walk.) is appearing in outbreak numbers in the New England States where it is defoliating large areas of beech and maple.

The gipsy moth (*Porthetria dispar* L.) is at a low ebb of abundance but the brown tail moth (*Nygmia phacorrhoea* Don.) is showing a decidedly upward trend in the New England States.

A repetition of the outbreak of the green-striped maple worm (*Anisota rubicunda* Fab.) which occurred in 1917 and 1918 is occurring in parts of Massachusetts and Connecticut.

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The following notes refer to September, 1930.

Grasshoppers still continue to attract considerable attention throughout the greater part of the country. In many places the damage has even increased over that done in August.

Special species of cutworms (*Noctuidae*) are reported from the Rocky Mountain and the West Coast States.

The fall armyworm (*Laphygma frugiperda* S. & A.) became generally prevalent over the Middle Atlantic States during the month, attracting unusual attention by attacking lawns in towns and cities.

Damage by white grubs (*Phyllophaga* spp.) is becoming very evident, as it advances, in the Central States from Indiana westward to Nebraska, and southward to Missouri.

The Hessian-fly situation as a whole is not alarming. From conditions in southern and west-central Illinois and parts of Missouri and Indiana however, there is reason to believe that unless checked by adverse weather conditions this insect will be decidedly more troublesome next year in this region than it has been in several years.

The cotton leaf worm (*Alabama argillacea* Hbn.) made one of its very extensive northward flights about the middle of September. The moths were observed in large numbers in southern Missouri on September 14; in southern Illinois on September 15; in the District of Columbia on September 23; in southern Michigan and New York City on September 24; and in Boston, Mass., on September 25.

Codling moth (*Carpocapsa pomonella* L.) eggs continued hatching during the first two weeks in September in Illinois, Indiana, and Kentucky, and moths were still emerging in central Ohio during the third week of the month.

In the Lake Region of Ohio a late brood of the oriental fruit moth (*Laspeyresia molesta* Busck) seriously damaged late varieties of peaches harvested after the middle of September. To the southward, in Indiana, Illinois, and Kentucky, infestation seemed to be much less serious, particularly in apple, and only moderate abundance is reported over the New England and South Atlantic regions.

A green stink bug (*Chlorochroa sayi* Stal) is recorded from the State of Nebraska for the first time. It was found injuring potatoes in Kimball County.

The imported cabbage worm (*Pieris rapae* L.) is very seriously infesting cabbages in Illinois, Iowa and Minnesota, and rather serious infestations by the cabbage webworm (*Hellula undalis* Fab.) are reported from North Carolina, Alabama, and Mississippi. The cabbage looper (*Autographa brassicae* Riley) is appearing in very considerable numbers over the same region and also northward into Virginia.

The beet leafhopper (*Eutettix tenella* Baker) is abundant in northern Utah and considerable damage is resulting from the infestation.

The fall webworm (*Hyphantria cunea* Drury) is occurring very abundantly throughout the eastern States from Vermont southward to Florida and Alabama.

The birch leaf skeletonizer (*Bucculatrix canadensisella* Chamb.) is occurring in a heavy outbreak in northern Maine and the upper and lower peninsulas of Michigan.

The elm leaf beetle (*Galerucella xanthomelaena* Schrank) is so prevalent in Connecticut that unsprayed trees are brown in many parts of the State, and it is more prevalent at Raleigh, N. C., than it has been during the past fifteen years.

Hungary : Damage to Vineyards by Sparrows (*Passer domesticus*) (1).

During the last two years sparrows have increased to an unusual extent and in August 1930 damaged the early grapes in an unprecedented degree. The sparrow is more difficult to combat than the starling (*Sturnus vulgaris*). The starling flees from man, even when unarmed ; it can also be kept away by noise-producing instruments. The sparrow on the contrary is used to noise and cannot be kept off the grapes by shouting or noises. They can only be got rid off therefore with firearms. It is practically impossible to carry out a campaign against sparrows' nests throughout a whole country. It seems easier to kill the birds in their winter roosts. Such roosting places exist even in Budapest, where the sparrows from autumn to spring perch for the night in the trees in streets and public gardens in such numbers that their droppings impede the traffic. The only method which gives hope of destroying these masses of birds consists in watering them during frosty winter nights with fire hose. The sparrows thus rendered incapable of flight would fall to the ground and could be put at the disposal of hospitals for food purposes. But the Societies for the protection of animals would probably be opposed to such a method, which could be employed only by official authorisation.

Persia : Some Insect Pests (2).

Earias insulana. — This cotton parasite was reported in Persia for the first time in 1928 by the entomologist of the Russo-Persian Society in the province of Kirman (Bam and Rafsendjan). In 1929 it was reported in the province of Fars and, in 1930, according to information collected by Mr. Djé, in addition to the southern provinces it has made its appearance at Ispahan, Yezd, Kashan, Kum, Khar and Veramine (Teheran) and in the Khorassan. The losses are estimated at

(1) Communication from the official correspondent of the Institute, Mr. Titus CsÖRGEY, Director of the Royal Hungarian Institute of Ornithology, Budapest.

(2) Communication from the official correspondent of the Institute, Mr. Ahmed H. ADLE, Director of the Agricultural College, Keredj, Teheran, Persia.

30 % of the crop in Kizman and up to 52 % at Torchize (Khorassan). *E. insulana* did not occur in Persia before 1928 when it came from India.

Eurygaster integriceps. — Following its normal development this serious wheat pest has increased its ravages since 1924, in which year it did its maximum damage. In 1930 a great part of the crop of the Veramine district was destroyed and in certain villages not even $\frac{1}{3}$ or $\frac{1}{4}$ of the crop was harvested. A renewed attack is expected in 1931.

Locusts. — Locust damage has been less in 1930 than in 1929, the province of Teheran in particular escaping damage. On the other hand the province of Azerbaïdjan which had hitherto not suffered from locusts was invaded by large swarms coming from Turkey. Defensive measures were taken from the first and special missions were sent into nearly every province, in particular into Kirman, Belouchistan (locusts coming from India), Fars, Khousistan, Louristan, Kirmanchah, Ispahan, Yezd, Kachan, Khorassan, Azerbaïdjan, etc.

In some regions, in addition to *Schistocerca gregaria*, the presence was reported of the Moroccan locust (*Docistaurus maroccanus*), which was easily destroyed, whereas the attacks of *Schist. gregaria* were sometimes very serious.

Active measures are already in hand for 1931. In particular a defensive chain will reach from the Mesopotamian frontier along the Persian Gulf coast to the Indian frontier, in order that the insects may be combatted as soon as they appear in Persia and, if possible, to discover the breeding grounds, which may exist in the South, specially in Deshti and Deschtistan.

Hellenic Republic : Locust Campaign 1930 (1).

In 1930 28 out of the 36 Departments were declared infested with locusts.

The invasions were equal to those of last year.

The destruction work was carried out more willingly by the inhabitants, who are compulsorily obliged to supply the labour.

The expenses rose to 40,000,000 drachmas, of which 12,000,000 were used for buying petrol, 5,000,000 for bran, 1,500,000 for molasses, 2,000,000 for sodium arsenate, 2,000,000 for spraying apparatus and accessories and 18,000,000 for transport charges and wages.

The amount spent on petrol would have been less if in the Departments of Florina, Kozani and Achaïa arsenical bait had been spread earlier, instead of spraying with petrol. In fact, half the total quantity of petrol i. e., 150,000 15 kg. tins, was consumed in these three Departments.

The abundant spring rainfall washed away the bait and obliged the district Services to renew it, which increased the expenses.

The control was perfectly successful. The locusts caused no damage.

The number of stock animals poisoned by the bait was very small this year, while last year it was considerable.

(1) Communication from the official correspondent of the Institute, Mr. C. A. TSSAKIDIS, Technical Advisor to the Minister of Agriculture, Athens.

LEGISLATIVE AND ADMINISTRATIVE MEASURES

South Australia. — By Notice of the Minister of Agriculture of 22 April 1930 the attention of landholders and local authorities is directed to the fact that they are required by law to destroy any of the following noxious weeds growing on lands and roads respectively held by them, and that the penalties for neglect will be strictly enforced:—

Asphodelus fistulosus, *Cenchrus tribuloides*, *Centaurea Calcitrapa*, *C. solstitialis*, *Chenopodium album* (for City of Adelaide only), *Cnicus arvensis*, *Conium maculatum*, *Cuscuta*, *Datura Stramonium*, *Euphorbia Terracina*, *Gomphocarpus fruticosum*, *Homeria collina*, *Hypericum perforatum*, *Kentrophyllum lanatum*, *Lycium campanulaceum* (except where grown as a hedge and kept trimmed to a width of 4ft. 6in. and to a height not exceeding 10ft.), *Solanum rostratum*, *S. sodomocum*, *Xanthium canadense*, *X. spinosum*. (*The South Australian Government Gazette*, Adelaide, September 11, 1930, No. 11, p. 544).

Spain. — Royal Decree No. 2,214 of 11 October 1930 which establishes the regulations for the exportation of citrus fruits provides, *inter alia*, that no fruits attacked by scale insects or other parasites or damaged by frost may be exported. (*Gaceta de Madrid*, Madrid, 12 octubre 1930, año CCLXIX, tomo IV, núm. 285, pags. 275 a 278).

India (I). — By Notification No. 1213-Agric., dated the 27th May, 1930, in exercise of the powers conferred by sub-section (1) of section 3 of the Destructive Insects and Pests Act, 1914 (II of 1914), the Governor General in Council is pleased to direct that the following further amendments shall be made in the Order published with the Notification of the Government of India in the Department of Revenue and Agriculture No. 580-240, dated the 22nd June 1922, namely:—

1. In sub-paragraph (i) of paragraph 1 of the said Order, for the word "Schedule" the words "first Schedule" shall be substituted.

2. For sub-paragraph 2 of paragraph 11 of the said Order the following shall be substituted; namely:

"(2) Cotton seed shall not be imported by sea save for experimental purposes by one of the officers named in the second Schedule appended hereto, and shall not be so imported by such officers save at the port of Bombay and in quantities not exceeding one hundredweight in any one consignment and on condition that it will be fumigated on importation with carbon bisulphide:

Provided that, if the cotton seed is accompanied by a certificate from a Government Entomologist of the country of origin to the effect that the seed and its container have been treated in such a way as to destroy all insect life, the seed shall be examined on importation by such officer as the Governor General in Council may appoint and shall not be required to be re-fumigated unless such examination shows that refumigation is necessary".

(1) Communication from Mr. M. S. A. HYDARI, I. C. S., Secretary, Imperial Council of Agricultural Research, Simla, India, to the International Institute of Agriculture.

3. For the heading to the Schedule to the said Order, the heading " First Schedule " shall be substituted and after that Schedule the following Schedule shall be inserted, namely :—

SECOND SCHEDULE.

(Paragraph 11 (2).)

The Director, Imperial Institute of Agricultural Research, Pusa.
 The Secretary, Indian Central Cotton Committee, Bombay.
 The Director of Agriculture, Madras Presidency, Madras.
 The Director of Agriculture, Bombay Presidency, Poona.
 The Director of Agriculture, Punjab, Lahore.
 The Director of Agriculture, United Provinces, Lucknow.
 The Director of Agriculture, Central Provinces, Nagpur.
 The Director of Agriculture, Bengal, Dacca.
 The Director of Agriculture, Bihar and Orissa, Sabour.
 The Director of Agriculture, Assam, Shillong.
 The Director of Agriculture, Burma, Rangoon.
 The Agricultural Officer, North-West Frontier Province, Peshawar.
 The Director of the Institute of Plant Industry, Indore.
 The Director of Agriculture, His Exalted Highness the Nizam's Dominions, Hyderabad.
 The Director of Agriculture, Mysore State, Bangalore.
 The Director of Agriculture, Baroda State, Baroda.

* * * By Notification No. 1343-Agri., dated the 21st June, 1930, in exercise of the powers conferred by sub-section (1) of section 3 of the Destructive Insects and Pests Act, 1914 (II of 1914), the Governor General in Council is pleased to prohibit with effect from the 8th August 1930 the import of unroasted coffee beans into the Madras Presidency by sea or, save where the import is from a place within India, by land.

Provided that the prohibition herein before contained shall not apply to a consignment of unroasted coffee beans produced in India and covered by a certificate of origin .

* * * By Notification No. 1541-Agri., dated the 23rd July, 1930, in exercise of the powers conferred by sub-section (1) of section 3 of the Destructive Insects and Pests Act 1914 (II of 1914), the Governor General in Council is pleased to direct that the following further amendments shall be made in the order published with the Notification of the Government of India in the late Department of Revenue and Agriculture No. 580-240, dated the 22nd June 1922, namely :—

(1) After paragraph 2 of the said Order the following paragraph shall be inserted, namely :—

" 2-A. No plant shall be imported into British India by air ; provided that plants which are infested with living insects and are intended for the introduction of such living insects may be so imported if they are accompanied by a special certificate

from the Imperial Entomologist to the Government of India that such plants are imported for the purpose of introducing such insects'.

(2) For paragraph 8 of the said Order, the following shall be substituted, namely:—

'8. Seeds of flax, bersim and cotton shall not be imported by letter or sample post, or otherwise than by sea.

'8-A. Coffee seeds shall not be imported by letter, sample or parcel post or otherwise than by sea'.

(3) In paragraph 9 of the said Order, the words "by sea" shall be omitted.

(4) In sub-paragraph (1) of paragraph 11 of the said Order, after the words 'by sea' the words 'or by air' shall be inserted.

(5) In paragraph 12 of the said Order, for the words "by sea from one port in British India to another" the words "by sea or by air from one port or place in British India to another such port or place" shall be substituted.

Italy. — A Decree of 18 November 1930 fixes new technical regulations for the exportation of citrus fruits. *Inter alia* no consignment may contain over 1 % of fruit contaminated with rot due to lesions, exclusive of rot caused by a defect of an organic character. Exportation of fruits damaged by frost is prohibited; and lemons and oranges must be from a commercial standpoint free from scale insects. (*Gazzetta Ufficiale del Regno d'Italia*, Roma, 21 novembre 1930, anno 71^o, n. 271, pp. 4959-4969, 18 figg.).

* * * In Santa Teresa di Riva, province of Messina a compulsory association ('Consorzio') for the protection of orchards against the 'mal secco' of lemons (*Deuterophoma tracheiphila* Petri) has been formed of all owners or holders of land situated in the following Communes, which have already been declared infected with the disease:— Santa Teresa di Riva, Savoca, Roccalumera, Nizza di Sicilia and Ali.

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NOTES

International Congresses. — An International Congress of Plant Pathology and Agricultural Entomology is arranged by the Crop Protection League ('Ligue pour la défense des cultures') to take place in June 1931 under the patronage of the 'Société de Pathologie végétale et d'Entomologie agricole de France'.

An International Congress of Fruit and Vegetable Production is arranged by the Horticultural Society of France for April 1931. It will include a Section dealing with the treatment of crop parasites and the necessary apparatus.

Scientific Films dealing with Agricultural Entomology. — The Italian 'L. U. C. E.' Institute for propaganda and education by means of the cinematograph, which has its headquarters in Rome (Palazzo della Stamperia), has produced a series of six films dealing with the life history of certain insect pests of agricultural plants or produce. The films were produced under the direction of Prof. F. SILVESTRI, Director of the Agricultural Entomological Laboratory of the 'R. Istituto Superiore Agrario' at Portici near Naples, and deal more particularly with the following insects:— (1) the Angoumois grain moth (*Sitotroga cerealella* Oliv.) and its parasite *Dibrachys boucheanus* Ratz.; (2) the olive fly (*Dacus oleae* Rossi) and its parasite *Opius africanus* Szépl.; (3) *Icerya purchasi* Mask and its natural enemy *Novius cardinalis* Muls.; (4) the Italian locust (*Calliptamus italicus* L.); (5) the corn weevil (*Calandra granaria* L.) and the 'cimice del grano' (corn-bug); this insect is still under investigation and has no scientific name; (6) the cherry fruit-fly (*Rhagoletis cerasi* L.); the olive moth (*Prays oleellus* F.); the Mediterranean flour moth (*Ephesia kühniella* Zeller) and its natural enemy *Nemeritis canescens* Nees; the turnip-gall weevil [*Ceutorhynchus sulcicollis* Gyll.]; the cuckoo spit insect [*Philacms spumarius* L.].

These six films can be supplied on request with explanations in French, English, Portuguese, Spanish and German as well as in Italian.

Prof. ALESSANDRO BRIZI, Segretario generale dell'Istituto, Direttore responsabile.

INTERNATIONAL BULLETIN

OF PLANT PROTECTION

DISCOVERIES AND CURRENT EVENTS *

French West Africa: Locust Control in Dahomey, Upper Volta, Mauritania, Niger, Senegal and French Sudan (1).

DAHOMÉY. During July 1930 locust swarms were somewhat rare in most Circles.

In the Circle of the Middle Niger however the swarms were nearly daily from the 1st to the 10th. The table below gives details of the swarms and their direction of flight.

Date of record	Places passed	Direction of flight
July 1-10 (nearly daily)	Circle of Middle Niger (Kandi)	S. W. and N. E.
" 16	" " Borgou (Parakou)	West
" 17	" " Borgou (Parakou)	"
" 19	" " Borgou (Niger Road)	"
" 19	" " Borgou (Parakou)	North East
" 26	" " Savalon (Savalou)	" "

The locusts reported were all young.

One swarm, that of the 26th, alighted in the Savalon region and destroyed several maize fields; the other swarms merely passed over the country flying towards the neighbouring Colonies on the east and west.

The records in Borgou were made following wet days, in cloudy weather without any wind.

As a result of the anti-locust campaign certain breeding grounds were discovered during July.

In the Circle of Djougou locusts laid eggs along the boundary of Togo in the districts of Séméré, Aledjo, Partago and along a line from Taneka-Kora to Sorouba.

In the Circle of the Middle Niger where locusts were reported during the first ten days of the month, eggs were laid in several places.

In the Circle of Savalon (district of Savé), although no breeding ground was definitely located, judging by the appearance of hoppers eggs were deposited between the Ouémé and the Okpara south of the parallel of Savé and in the regions of Dassa-Zoumé, Paouingnan between the Ouémé and the Zou.

During August the swarms were less numerous.

* In this, as in the next chapter, the countries are arranged in French alphabetical order.

(1) Communication from the General Government of French West Africa, official correspondent of the Institute.

They were reported only in the regions of Savalou and the Middle Niger.

The first came from the west and south-west and passed over on the 1st, 5th, 6th and 7th in a north-easterly direction. They caused some damage to maize crops.

Another swarm appeared on the 28th in the Middle Niger between Alfacara and the river Kokoye ; it went in the direction of the Niger.

No breeding ground was discovered this month.

No swarms were reported in Dahomey during September.

UPPER VOITA. The anti-locust campaign was carried on actively ring the third quarter of 1930.

A local Decree dated 25 July 1930 prescribed the necessary measures to combat locust invasions and the requisition of natives for locating, collecting and destroying locusts.

In all places where large swarms of adult locusts have made their appearance these measures have been rigorously carried out and a large number of locusts killed.

All the efforts however to abate the scourge have made no appreciable difference as yet to the situation.

Numbers of swarms have again been reported, more particularly in the second half of September.

MAURITANIA. No part of the Colony has remained free from migrating locusts.

The invasion began in the middle of June 1930 in the Guidimaka, then locusts appeared in succession at Tidjikdja on July 25, at M' Bout on August 2, Akjouit on the 7th, Kiffa, Tamchakett and Kaedi on the 13th, Port-Etienne on the 16th, Atar on the 21st and Boutilimit on the 22nd.

Then the hatching period began and while the Guidimaka was already infested with migrating hoppers in mid-July similar swarms appeared at Boghe on September 8, at Kaedi on the 11th, Kiffa and M' Bout on the 13th and at Tidjikdja on the 18th.

When development was completed the locusts took flight and a second series of swarms crossed Mauritania, appearing at Port-Etienne on October 1, at Kiffa and Chinguetti on the 3rd, at Boghe on the 9th, at Kaedi on the 10th and at Atar on the 22nd.

NIGER. Numerous swarms, some of them large, were reported over nearly the whole extent of the Colony, the maximum being in June. The first came from the north-west and flew south ; those that followed came mostly from the south-west and usually flew to the N. N. E.

No swarms were reported in the Subdivision of Tanout.

On the night of June 27-28 some locusts alighted near the post of Bilma, but flew away in an easterly direction without having done any damage.

The swarms passed over the Subdivision of Tessaoua without alighting ; in the Subdivision of Magaria they alighted only for short spells.

Eggs were marked and destroyed in the Subdivision of Konni, and no hoppers were reported there during the second quarter of 1930.

Large quantities of hoppers were destroyed in the Circle of Tillabéry and the Subdivisions of Say, Dosso, Filingué (Ballol), Madaoua and Tahoua.

The damage was serious in the Subdivision of Téra (Circle of Tillabéry) where a number of fields of small millet covering several hectares were completely destroyed ; the farmers re-sowed with large millet all the suitable land and sowed again large quantities of cow pea.

In the other Subdivisions of the Colony the damage was nil or insignificant in the second quarter ; it was however serious in Nigeria, specially in the regions of Sokoto and Maidoungouri.

At the end of July somewhat serious damage to the small millet crops was reported in the Circles of Niamey, Dosso and Maradi, but the groundnuts were not attacked.

Locust control was actively carried on throughout the whole Colony.

A decree is about to be enacted which will make it permissible to commandeer natives in cases of large invasions, and will provide for the tracking down and watching of breeding grounds and the destruction of hoppers as they emerge by burying and burning.

SENEGAL. The passing of locust swarms did not slacken during the third quarter of 1930. Their presence was reported over nearly all the territory. The Circle of Haute-Gambie was particularly troubled ; in certain cantons the crops were entirely lost.

The anti-locust campaign has never been so active. The defence gangs helped by the inhabitants attacked the locusts with branches, killing considerable quantities. Unfortunately the wooded regions often afford shelter from which it is extremely difficult to dislodge the locusts.

Wherever hatching was reported the hoppers were led into trenches, stamped on and covered in with earth.

The Administrator of Casamance reported in July 1930 that locusts which had alighted in the Circles of Bignona and Sedhiou had flown away in the direction of Portuguese Guinea.

It seems to be ascertained from information received at the chief town that the invasions came from the Sudan and Guinea.

FRENCH SUDAN. If it is a fact, as the natives in the French Sudan assert, that locusts have invaded the territory for thirty years and bred there for five or six, it is none the less true that the serious invasions of the last two years have been the first which have made control measures necessary.

The recognised methods of control could not be effectively applied in 1929 owing to the sudden and unexpected nature of the attack. But in 1930 all arrangements were able to be made in time to check as far as possible the damage, which would in certain regions have meant the complete destruction of all the growing crops.

(1) Flying Swarms. Locust swarms generally follow the direction of the winds they encounter, sometimes from east to west, sometimes from west to east. The same swarm in different stages of development may pass and re-pass several times over nearly the same point without it being recognised. Also they are always reported as coming from neighbouring Circles or Colonies whereas it would be well to admit that some of them originate from the colonies of hoppers whose hatching is reported from most directions some time after the passing of locusts.

In April 1930 locusts made their first appearance in the Southern Circles (Koutiala, Sikasso, Bamako, Ségou). It was only later that they were observed in the east (Ansongo, mid-June) and north (Niafunké, end of June). In July and August the swarms became more frequent and were reported over most parts of the territory.

(2) Protection against Locusts. We are unfortunately practically at the mercy of locusts. Noise and smoke screens — thickened in some places by the use of petrol — do not always stop them, specially as in winter the grass is too damp to serve as fuel.

Crushing of the adults during copulation does not give really satisfactory results.

Better results might perhaps be obtained if it were possible to use flame-throwers of a type similar to that used in the army. They could be manipulated by experts, who would be easy to recruit among the old riflemen and could be rapidly transported under the direction of a non-commissioned officer to the scene of action on horseback or in lorries.

(3) Oviposition. It has been found that locusts can deposit their eggs as well in moist as in dry soil, even when stony, and that they show no preference for either a treeless plain or for brushwood.

Although in very few places the breeding grounds have been located and turned up with the plough — an operation which exposes the eggs to the air and prevents their hatching — it is towards this simple device that the attention of farmers must be turned. The forty-five days of incubation before hatching can easily be made profitable by comparatively few gangs, for the work is simple though it results in the destroying of enormous numbers of future insects. We shall be helped in this work by the memory of the results achieved in 1930 by a campaign which was undertaken in the face of a population convinced that our efforts would be in vain and entirely powerless against a scourge too great for human resistance.

(4) Hatching and Invasions of Hoppers. All the Circles have had hoppers to contend with, but while at certain places — fortunately the most numerous — they have been almost completely destroyed, in others the attack was sudden and so generalised that the people could not cope with it. This was the case in the Circles of Kayes and Macina and in the Subdivision of Kolokani. Everywhere it was necessary first to overcome the indifference of the natives to anything which is not their most immediate concern. Thus newly hatched or migrating hoppers were never reported except by a European or native trader or a travelling Government official, which frequently prevented the control work being started until after serious damage had been done.

Certain Circle Commandants have observed that migrating swarms invariably travel towards the point occupied by the sun at about 9 o'clock in the morning, but that their progress is often affected in the course of the day by changes of wind. Progress is somewhat slow however (a few metres a minute) and the column keeps very compact, except in wooded land, which facilitates their destruction to some extent.

It may be of interest to mention that the Administrator of Macina has observed that hoppers coming from the south cross the Niger between Ké-Macina and Kobry where the current throws them on to the north bank. They then proceed on their way towards the north-east.

(5) Control of Adults. Various methods already in use in the North African Colonies have been recommended, some simple, such as digging pits and trenches and firing, others more perfected, such as 'melhafas' and poisoned bait.

Melhafas. Tents made of material 3 to 4 metres wide and 10 metres long

were experimented with in all the Circles. Each Circle received at least 10 melhafas in May 1930. This quantity was doubled wherever the ground was particularly suited to this kind of trap. It may be said that the best results were obtained everywhere, except on land covered with dense scrub and on clay soil soaked by recent rain.

Gangs of 200 men and over were instructed in their manipulation in advance so that when invasions occurred they were able to get to work at once, except in the Circle of Gao where the natives turned out to be unskillful in manipulating them. An explanation of this has been sought, because elsewhere the natives had so little difficulty with them that in Koulikoro the women helped even when there were not enough men.

The combination of pits or trenches and melhafas often gave excellent results. The latter were arranged in the form of an open *U* leading the insects to the vertical-sided pits, which were filled in as soon as they were three quarters full.

The following remarks on the use of melhafas may however be noted :—

They are rapidly worn out and end by splitting under the weight of the hoppers about to be buried ; they are difficult to manage in a high wind ; and, as has been said above, they cannot be used in thickly wooded or damp land.

Trenching and Fire. As has just been stated the combination of trenches and melhafas was often used. Sometimes however the melhafas being lacking or the lie of the land not allowing of their use, trenches were just dug along in front of the columns of hoppers and formed a sufficient defence. But this method requires a large number of workers as it must be rapidly planned and carried out.

Fire was used only in cases of complete surprise and, although the natives were sometimes almost burning the straw of the roofs and empty millet barns, the only result was to disperse the insects and so complicate the work of the gangs carrying out a systematic control.

Poisoned baits — Potassium arsenate and molasses were sent into all Circles from May on. These mixed with millet bran formed a bait that most of the Administrators found very effective. In one of the cases reported the mixture was spread in the shape of an open *U* round the head of a column 200 metres wide and 500 metres deep. A hundred kilos of poisoned bait were used. The next day not a locust was alive in the neighbourhood, but innumerable dead ones were piled by the wind at the foot of the trees and ant hills.

It must be added that the use of such poison is not without its drawbacks. Firstly, the quantity of arsenate used in making a whole anti-locust campaign effective would need to be very large. Moreover the use in bulk of such a violent poison is not free from risk unless its use is always under the direction of a European, which is practically impossible.

In spite of the difficulties of application poisoning is the only method of control used on the Gold Coast, the bait being formed of horse dung and chopped grass mixed with arsenate previously diluted with water. This mixture, sprayed at the rate of a petrol tin-full to thirty metres on to swarms which have alighted in the grass for the night, has given very satisfactory results.

It is certain however, and the experience of this season shows, that the use of arsenic is effective only in desert or semi-desert regions where little labour is required

(6) Results of the Control Campaign. It would be superfluous to describe once more the ravages caused by locusts and hoppers in the plantations. In certain parts the land has been resown as many as six times and now that the danger is in part averted, unless there is a further attack when the

grain is forming, the anxiety of the whole population liable to be brought to starvation at any moment can readily be imagined.

The quantity of hoppers destroyed gives some measure of the danger. It has reached in some places 400 kilos per melhafas daily, and with ten melhafas with pits trebling their action five or six days were sometimes needed to destroy a single column. In one of the least affected Subdivisions, that of Bamako, seventeen such swarms have been destroyed up to the present.

It should however be reported that the advice to increase the cultivation of the so-called underground crops which are less affected by locusts has been followed. The areas devoted to manioc, potatoes and underground peas have been more than doubled in some places, and there has been considerable increase in the sowing of groundnuts and cotton.

As, on the other hand, the rains although late have been evenly distributed it is to be hoped that the coming harvest will satisfy all needs. It remains none the less true that the results obtained are still inadequate, but the lessons of experience will not be lost and when the time comes the campaign will be renewed with increased means and methods all ready to hand.

England and Wales : New or Interesting Phytopathological Records for the Year 1930 (1).

(a) Plant parasitic bacteria and fungi that have been encountered in England and Wales during the year 1930, and that are believed not to have been recorded there previously :—

Bacterium Medicaginis var. *phaseolicola* (Burk.) Link & Hall ; causing the so-called Halo-Blight of Dwarf Bean (*Phaseolus vulgaris*).

Leptosphaeria heterospora (de Not.) Niessl. ; on rhizomes of Iris, but doubtfully parasitic.

Oidium Hortensiae Jorstad ; on Hydrangea leaves.

Puccinia mirabilissima Peck ; on *Mahonia* (*Berberis aquifolium*), rather widely distributed.

Puccinia Opizii Bubák ; aecidial stage in minimal amount on lettuce imported from Holland.

(b) Although the parasites themselves mentioned below are not new to the country, yet their attack on the particular hosts in the following short list is interesting as being believed to be the first of the kind recorded for England and Wales :—

Phytophthora Cactorum (Léb. & Cohn) Schroet. ; causing a rot of strawberry fruits.

Leptosphaeria Coniothyrium Sacc. ; in its perithecial stage, upon raspberry canes.

(1) Communication from the Ministry of Agriculture and Fisheries, official correspondent of the Institute.

Glomerella cingulata (Stonem.) Spauld. & von Schrenk ; in its Gloeosporium stage, causing a ripe rot of grapes.

Pleospora herbarum (Pers.) Rab. ; on lettuce.

Corticium centrifugum (Lev.) Bres. ; causing decay, following Scab (*Venturia inaequalis* Aderh.), on apples imported from Canada.

Helicobasidium purpureum (Tul.) Pat. ; in sporulating condition on a partially decayed mangold root, in signally intimate association with its sterile form *Rhizoctonia Crocorum* (Pers.) DC.

Eritrea : Locusts (*Schistocerca gregaria*) (1).

Serious new invasions of locusts were reported in October 1930, for the most part coming from beyond the Abyssinian frontier, particularly from the Avergallè region. The swarms generally flew steadily towards the north-east, crossing the territory of the Seraè and the villages of the Acchelè Guzai which bound it. When the swarms reached the northern part of the plateau they scattered down the numerous valleys cut by streams flowing into the eastern plain towards the Red Sea coast. Some seem to have flown east across the sea.

Two particularly dense swarms were reported on the 22nd and 25th October in the region of Tessenei, having come from the Sudan, these also flew east until they reached the middle valley of the Barca and followed it down towards the Red Sea coast.

It was noted that two swarms, like those coming from Abyssinia, were composed of pink locusts.

No further hatching of hoppers ('cucubtà') was reported during the month in the Colony ; the control work against those hatched in September was however continued, particularly in the territory of the Commissariat of Cheren. This campaign, in which participated not only the squadrons organised by the Government but the whole native population, gave very favourable results, judging by the fact that of all the swarms reported in Eritrea not one had remained here but all came from Abyssinia or the Sudan.

It is expected that the locusts alighted in the eastern plain will for the most part remain there until they reach sexual maturity when they will copulate and lay eggs which will give rise to the spring generation which heralds the beginning of each annual invasion.

The Office of Agriculture and the Commissariats had already been made responsible for a survey service which should enable any locality with eggs to be detected as well as carrying on the campaign against the adult locusts.

During the first days of November 1930 dense swarms of young pink locusts entered the Colony from the south, crossing the Abyssinian frontier. A single swarm was reported in the north on the 13th, near Carora on the Sudan frontier. This swarm was composed of yellow locusts which began to lay eggs on the 17th. It was immediately determined to plough the land where eggs were found and to

(1) Communication from the Phytopathological Service of the R. Ufficio Agrario of Eritrea, Asmara, transmitted by the Government of the Colony.

inspect the district the swarm had crossed in case of any further deposits of eggs.

Locust swarms coming from beyond the Ethiopian frontier crossed the provinces of the Seraë and the Hamasiën in a north-easterly direction towards the eastern plain and more particularly the Red Sea coast. Throughout the whole of the territory in the direction of flight arrangements were made for locating any egg deposits and for killing adults; the latter, though difficult, was very successful in the zones where sufficient labour was available.

During the month natives collected 500 sacks of locusts with a total weight of about 450 quintals. These locusts were buried by the natives in deep pits and later used as manure.

United States of America: Outstanding Entomological Features (I).

The present notes refer to October, 1930.

October developments in the grasshopper situation include defoliation of young citrus in many parts of Florida, serious destruction of new fall plantings of alfalfa and crimson and red clovers in Franklin and Winchester Counties, Tenn., and rather large populations building up in northern Nebraska, western North Dakota, and parts of Iowa.

In addition to the rather heavy infestation of the Middle Atlantic States by the fall armyworm (*Laphygma frugiperda* S. & A.), the insect was quite generally prevalent and in many cases seriously destructive in Ohio, Indiana, Kentucky, Mississippi, and Texas.

A heavy growth of volunteer wheat, in southeastern Nebraska, which is now developed to such a size that it can not be easily destroyed by disking, makes possible a serious infestation of the Hessian fly (*Phytophaga destructor* Say) in wheat next spring in that section. Moderate infestation is also reported from several counties in southern Iowa.

A heavy flight of the chinch bug (*Blissus leucopterus* Say) to hibernation quarters took place in Illinois during early October. Practically all lawns of St. Augustine grass in Fairfax, S. Car., have been seriously injured by this insect.

The corn ear worm (*Heliothis obsoleta* Fab.) is appearing in noticeable numbers in southern New Hampshire the first time since 1922. It is reported as quite prevalent throughout the remainder of the New England and Middle Atlantic States, causing a loss of at least one-third of the corn crop in the intensive truck-growing section of Long Island, N. Y. This heavy infestation extended westward as far as Michigan, Nebraska, Kentucky, and Indiana.

The velvetbean caterpillar (*Anticarsia gemmatilis* Hbn.) though appearing in rather large numbers in parts of Louisiana, is not extending so far westward as it did in the season of 1929.

A scarabeid beetle (*Bolbocerosoma bruneri* D. & McC.) was found early in September damaging golf greens near Lincoln, Nebr., in the same manner as do common white grubs.

Injury by the codling moth (*Carpocapsa pomonella* L.) is being reported as quite generally severe throughout the New England, Middle Atlantic, and South Atlantic States and westward over practically the entire Mississippi Valley Region. In Washington State, however, infestation is said to be much below normal.

(1) Communication from the official correspondent of the Institute, Mr. J. A. HYSLOP, Senior Entomologist in Charge, Insect Pest Survey, Bureau of Entomology, United States Department of Agriculture, Washington, D. C.

Considerable damage by leafhoppers (Cicadellidae) on deciduous fruits is reported from New England, West Virginia, Georgia, and Indiana.

Following extremely low temperatures last winter in parts of Washington State woolly apple aphid (*Eriosoma lanigerum* Hausm.) infestations were much below normal this year.

The hot summer and mild fall are believed to have been responsible for a very marked increase of the San Jose scale (*Aspidiotus perniciosus* Comst.) population in central and southern Illinois.

The twig girdler (*Oncideres cingulatus* Say) is quite generally prevalent and causing some injury to pecan and English walnuts in parts of Virginia, North Carolina, and South Carolina.

The finding of the walnut husk fly (*Rhagoletis juglandis* Cress.) at the mouth of Cajon Canyon in San Bernardino County, Calif., indicates that this insect extends over a much larger area in southern California than was originally suspected.

The citrus whitefly (*Dialeurodes citri* Ashm.), Florida red scale (*Chrysomphalus ficus* Ashm.), and purple scale (*Lepidosaphes beckii* Newm.) are reported as being more abundant than usual for this season of the year. It is believed that the dry weather has hindered the development of the entomogenous fungi which normally partially control these pests.

A single specimen of the Colorado potato beetle (*Leptinotarsa decemlineata* Say) was collected in Davis County, Utah, this year. This insect has not been observed in Utah for several years.

The potato tuber worm (*Phthorimaea operculella* Zell.) is much more prevalent on the Department of Agriculture's farm at Arlington, Va., than it has been for the past two years. Specimens of this insect were also received in potato tubers from Frederick County, Md., this year.

The Southern green stink bug (*Nezara viridula* L.) is reported as being very effectively controlled by the parasite *Trichopoda pennipes* Fab. in Florida.

The cabbage looper (*Autographa brassicae* Riley) was unusually prevalent in the Norfolk section of Virginia, southern Illinois, the whole of Mississippi, and parts of Texas.

The Mexican bean beetle (*Epilachna corrupta* Muls.) is quite generally reported as either absent from fields or decidedly reduced throughout the New England, and Middle Atlantic region. No reports of damage by this insect were received during the month of October.

A very unusual type of injury was observed in September in the Norfolk section of Virginia. A small black burrower bug (*Pangaeus uhleri* Sign.) was attacking new sprouted spinach, killing the young plants before they pushed through the soil. They were so numerous in one field that 43 acres had to be resown.

Thousands of acres of Douglas fir have been killed in the Colville National Forest in Washington State by the Douglas fir tussock moth (*Homocampa pseudotsugata* McD.). The serious outbreaks of this insect in central Idaho now seem to be controlled by parasites.

The mountain pine beetle (*Dendroctonus monticolae* Hopk.) is causing serious damage on both the east and west side of the Cascade Range in Washington State.

What is believed to be one of the largest outbreaks of the southern pine beetle (*Dendroctonus frontalis* Zimm.) is reported from the Smoky Mountain National Park in North Carolina and Tennessee.

The squash bug (*Anasa tristis* DeG.) is reported from Payette and Gem Counties, Idaho.

The fifth case of infestation of cedar trees by the larvae of the moth (*Tortrix*

cockerellana Kearf.) that has come to the attention of the entomologists of Nebraska was reported this year from Frontier County. The insect has been known to occur in the State for the past four years.

The finding of *Cleonus piger* Scop. in Yates County, N. Y. again this year seems to indicate that this European pest is established in that State. In Europe the pest is known as a sugar-beet insect.

India: Infection of *Setaria italica* by *Sclerospora graminicola* on Green Foxtail and Everglade Millet (1).

In our studies on the cross-inoculation of different hosts of *Sclerospora graminicola*, it has been possible to secure as high as 70 per cent. infection of *Setaria italica* by oospores of *Sclerospora graminicola* on *Setaria viridis* and *Setaria magna*.

India: A New Host of *Sclerospora graminicola* var. *andropogonis-sorghii* (1).

Sclerospora graminicola var. *andropogonis-sorghii*, which causes shredding of jowar (sorghum) in the Bombay Presidency, has also been found to infect maize naturally. Artificial infection of maize was secured by the oospores of *S. graminicola* var. *andropogonis-sorghii*, when placed on the seed in the soil. The biometrical dimensions of the conidia of the fungus collected from sorghum and maize, were exactly similar.

India: Downy Mildew of the Grape in the Bombay Presidency (1).

Downy mildew of the grape, caused by *Plasmopara viticola*, made its appearance in an epidemic form in the monsoon of 1929. The season was sub-normal and was preceded by a cold wave in the month of February resulting in a very severe damage to the grape vines which had consequently to be pruned out very early.

Switzerland: Potato Wart Disease [in German Switzerland in 1929 and 1930 (2).

The new outbreak in 1929 of potato wart disease (*Synchytrium endobioticum* [Schilb.] Perc.) at Root, Canton of Lucerne, was connected with the 1925 outbreak. The land infected in 1925 was put down to grass for 4 years, was then sold and ploughed and again put down to potatoes, which became infected with the disease by resting sporangia in the soil.

Two further centres of infection were reported in 1929, one at Tägerschen, Canton of Thurgovie, the other at Kaltbrunn, Canton of St. Gall. They were isolated centres on two small plots of land already infected the previous year. The

(1) Communication from the official correspondent of the Institute, Dr. B. N. UPPAL, Plant Pathologist to Government, Bombay Presidency, Poona.

(2) Communication from the official correspondent of the Institute, Dr. E. NEUWEILER, Eidgenössische Landwirtschaftliche Versuchsstation, Oerlikon-Zürich.

occurrence of wart disease was also detected in the district of Lustenauer-Riet, Vorarlberg, which forms part of the Commune of Widnau, Canton of St. Gall.

In 1930 the only outbreak of wart disease was at Marbach, Canton of St. Gall. The necessary measures (cooking potatoes, disinfecting storehouses, land and implements, sowing the land with grass) were taken to eliminate the centres of infection and prevent the spread of the disease.

LEGISLATIVE AND ADMINISTRATIVE MEASURES

Western Australia. — On 7 November 1930 (Agric. No. 2070/25 ; Ex. Co. No. 2522) the Director of Agriculture has notified that Cape Tulip (*Homeria collina*) has been declared a noxious weed under "The Noxious Weed Act, 1924", within the boundaries of the Wagin Municipality. (*Government Gazette of Western Australia*, Perth, November 14, 1930, No. 55, p. 2521).

Brazil. — By a 'resolução' of 20 September 1930 the exportation of banana plants by land or sea from the State of São Paulo is prohibited. (*Boletim do Ministério da Agricultura, Indústria e Commercio*, Rio de Janeiro, 1930, anno XIX, vol. II, n. 3, pag. 351).

Cuba. — In consequence of its having been proved that the Mediterranean fruit fly ('mosca del Mediterráneo', *Ceratitis capitata*) has been completely stamped out in Florida, by 'resolución' of 19 November 1930 all the decrees and 'resoluciones' promulgated in the Republic of Cuba to prevent the introduction of the fruit fly from Florida have been repealed.

The regulations remain in force however by which all holds and refrigerator chambers containing raw fruit on ships coming from Jamaica, the Bermudas, Mexico, Central and South America, Porto Rico, the Hawaiian Islands, Australia, the Philippines, Spain, France and Italy must remain sealed while in Cuban ports. (*Revista de Agricultura, Comercio y Trabajo*, Publicación oficial, órgano de la Secretaría de Agricultura, Comercio y Trabajo, Habana, Cuba, enero de 1931, año XII, vol. II, núm. 18, págs. 71 a 72).

Straits Settlements. — By Notification No. 859 published on the 2 May 1930 the Governor has emended the Pests Notification Rule, 1925 which were published as Notification No. 759 on the 1 May 1925, by adding to Clause 1 of the Schedule a new paragraph (d) as follows:—

Name of Pest

Period within which notice to be given.

<p>"(d) Secondary leaf fall of Hevea caused by <i>Oidium Heveae</i>, Steinm., a disease of the leaves.</p>	<p>Within fourteen days of first finding pest".</p>
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(*Rubber Research Institute in Malaya, Quarterly Journal*, Kuala Lumpur, 1930, Vol. 2, No. 2, p. 68).

Federated Malay States. — By Notification No. 3129 published on the 9 May 1930 the Chief Secretary to Government has amended the Pests Notification Rule, 1927 which was published on the 11 February 1927, by the addition to the Schedule of the following :—

Name of Pest	Period within which notice to be given
(1) Pests of Rubber. (d) Secondary leaf fall of Hevea caused by <i>Oidium Heveae</i> , Steinm., a disease of the leaves.	Within fourteen days of first finding pest.

(*Rubber Research Institute in Malaya. Quarterly Journal*, Kuala Lumpur, 1930, Vol. 2, No. 2, p. 68).

France. — By Decree of 26 November 1930 the entry into France of plants and parts of plants belonging to the genera *Abies*, *Picea*, *Pinus*, *Pseudotsuga* and *Tsuga* is prohibited as being liable to introduce *Rhabdochline Pseudotsugae*.

The introduction into French territory of plants and parts of plants belonging to genera other than those specified above is allowed on condition that (1) each consignment is accompanied by an official sanitary certificate stating that the packages contain no plants or parts of plants belonging to the above mentioned genera and that the goods consigned and the plantations from which they originate have been inspected and found free from *Rh. Pseudotsugae*; it shall also state the name of the species consigned and the locality in which the plants were grown— (2) the name of the species consigned must be indicated on the packages. (MINISTÈRE DE L'AGRICULTURE. DIRECTION DE L'AGRICULTURE. *Bulletin de l'Office de Renseignements Agricoles*, Paris, 1^{er} décembre 1930, année 1930, n° 23, p. 401-402).

Italy. — By Ministerial Decrees of 22 November 1930 the Communes of Mondovì in the province of Cuneo and Guardialfiera in the province of Campobasso have been declared infected with grape phylloxera. (*Gazzetta Ufficiale del Regno d'Italia*, Roma, 4 dicembre 1930, anno 71^o, n. 282, p. 5213).

** By Ministerial Decree of 16 December 1930 the facilities conceded to denaturated glucose have been made applicable to the manufacture of poison baits for insecticidal purposes. (*Gazzetta Ufficiale del Regno d'Italia*, Roma, 24 dicembre 1930, anno 71^o, n. 298, p. 5571).

** By virtue of the Law No. 9 of 8 January 1931 the regulations contained in articles 3 and 4 of Royal Decree No. 3071 of 31 December 1923 relating to the revision of the land tax on citrus plantations affected with root rot ('marciume radicale') are extended to citrus plantations damaged or destroyed by the 'mal secco'. (*Gazzetta Ufficiale del Regno d'Italia*, Roma, 21 gennaio 1931, anno 72^o, n° 16, p. 284).

** The Ministry of Agriculture and Forests has given permission for the exportation of American vine cuttings from Sicily without permit or disinfection; for rooted cuttings disinfection remains obligatory.

** The Ministry of Agriculture and Forests has prohibited the catching of moles — the principal natural enemy of the mole cricket — in the provinces of Verona, Vicenza, Treviso, Brescia and Varese and any infringement of the law will be punishable by a fine of from 100 to 1000 liras.

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[*Acrobasis* spp.].

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[*Roesleria Aurantiae* n. sp. Description in Portuguese].

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[*Peronospora* sp.].

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[*Cydia pomonella*].

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[*Alternaria Solani varians*].

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INTERNATIONAL BULLETIN OF PLANT PROTECTION

DISCOVERIES AND CURRENT EVENTS *

Belgium : Short Account of Crop Disease Conditions in 1930 (1).

Cereals. Yellow rust of wheat (*Puccinia glumarum* f. sp. *Tritici*) was relatively abundant.

For some years a steady increase has been observed in smut on winter barley, *Ustilago nuda* and *Ust. Hordei* being equally abundant. Intermediate forms between the two species have also been observed and are now under study.

Potatoes. The situation as regards wart disease (*Synchytrium endobioticum*) remains unchanged.

Phytophthora infestans was abundant and caused serious loss.

From an enquiry on degeneration diseases it appears that mild mosaic and leaf roll are the most frequent affections of this type in Belgium. Rugose mosaic and streak are much less frequent.

Beets. Yellowing was frequent, as many as 30 % of the plants sometimes being affected; mosaic on the other hand was scarce (max. 3 %); both made their appearance late.

Flax. The part played by *Asterocystis radialis* in the scorch of flax having been disputed the study of this disease, which was fairly frequent in 1930, was taken up again. In all the specimens examined, which came from Flanders, the presence of the *Asterocystis* was ascertained, while species of *Pythium* were always absent. These observations seem to show that flax scorch is a pathological condition which may be caused by various root parasites in different regions (Belgium, *Asterocystis radialis*; Holland, *Pythium megalocanthum*, etc.).

Tobacco. A bacterial disease very similar to the American wild fire was observed in the valley of the Semois.

Chicory. A mosaic of the nature of the virus diseases was observed in the Gembloux district.

Rose. Several cases of serious infection of rose plants with *Armillaria mellea* were observed.

Tree and bush fruits. There were various records of infection of apple trees by *Armillaria mellea*, of pear trees by *Phacidiella discolor* and of plum trees by *Verticillium albo-atrum*. *

A curious affection of gooseberries was caused by a fungus that I connect with *Corticium concentricum*.

* In this, as in the next chapter, the countries are arranged in French alphabetical order.

(1) Communication from the official correspondent of the Institute, Prof. EM. MARCHAL, Director of the State Phytopathological Station at Gembloux.

Forest trees. There was a renewed outbreak of the canker of the Canadian poplar in various parts of the country. This disease is probably identical with that which is raging in Northern France. A study of the disease has been undertaken again.

Eritrea: Locusts (*Schistocerca gregaria*) (1).

On December 8, 11 and 14, 1930, eggs were reported in the vicinity of Mersa Fatma and Mersa Deresa; these eggs were attributed to a dense swarm of yellow locusts which was recorded on December 5 near the northern boundary of the Colony coming from the Sudan and flying towards the Red Sea coast, where are situated Mersa Fatma and Mersa Deresa. Rahib, which is further inland, is on the direction of flight.

Towards the end of the month the first hatching of 'cucubtà' (hoppers) being reported from the same places the necessary measures were taken for the destruction of these breeding centres.

Another swarm was reported on the 23rd in the north of the Colony, south of Alghena, flying north-north-east; it appears that these locusts belonged to the swarms reported on the 5th.

Swarms of varying importance were reported on December 9, 10, 11, 14 and 17 near M. Uorche (north of Cheren), M. Urug (south of the Alighede valley), M. Sabar (south of Gheleb), Debrasina and Barresa. All these swarms consisted of yellow locusts and were flying towards the sea.

In case of possible laying of eggs an active look out is being kept over the whole of the eastern plain.

India: New Diseases reported during the Year 1930 (2).

Pusa (Reported by Dr. W. McRAE, Imperial Mycologist, Imperial Institute of Agricultural Research):—

Triticum vulgare. A new species of *Tilletia* was discovered on certain hybrid wheats in Punjab and named *T. indica* n. sp. by Dr. M. Mitra. A description will appear soon.

Saccharum officinarum. *Sclerospora sacchari* has been recorded for the first time in India on Co. 316 grown in Pusa.

Zea Mays. *Botryodiplodia theobromae* Pat. causing cob rot in storage.

Cajanus indicus. A new species of *Cercospora*. *Colletotrichum cajani* Rangel = *Glomerella cingulata* (produces ascigerous stage in culture).

Sorghum vulgare. *Helminthosporium maydis*.

Cicer arietinum. A species of *Sclerotium*.

Capsicum annuum. Wilt caused by a *Fusarium*.

Bombay Presidency (Reported by Dr. B. N. UPPAL, Plant Pathologist):—

Cotton. *Alternaria macrospora*.

(1) Communication from the Servizio Fitopatologico dell'Ufficio Agrario of Eritrea, transmitted by the Government of the Colony.

(2) Communication from the official correspondent of the Institute, Mr. W. McRAE, M. A., D. Sc., F. L. S., Imperial Mycologist, Imperial Institute of Agricultural Research, Pusa, India.

Citrus. Rosellinia sp.

Dolichos biflorus. Mosaic disease.

Control measures. Three applications of 200-mesh fine sulphur have given very effective control of powdery mildew and mango jassid hoppers, of which three species are found in the Bombay Presidency (*Idiocerus niveosparus*, *I. clypealis* and *I. atkinsoni*). Sulphur acts as a preventive and curative against powdery mildew, and as deterrent against hoppers. The cost of treatment does not exceed Rs. 1/- per tree and results in a net profit of about Rs. 7/- per tree.

Very effective control of fig rust, *Uredo fici*, has been secured by sulphur dusting.

Dharwar (Reported by Dr. B. B. MUNDKUR, Cotton Mycologist):—

Arachis hypogaea. Rosette, a virus disease.

Capsicum annuum. *Fusarium* wilt.

Madras Presidency (Reported by Mr. S. SUNDARARAMAN, Government Mycologist):—

Oryza sativa. *Fusarium* sp. causing foot rot.

Aristolochia bracteata. *Colletotrichum* sp.

Bengal (Reported by Mr. G. P. HECTOR, Economic Botanist):—

Hibiscus Sabdariffa var. *altissima*. *Phytophthora* sp.

India : Two Injurious Insects recently appeared in the Punjab (1).

Alcidcs porrectirostis, Mshl. (Curculionidae : Coleoptera) has been recorded in the Punjab doing enormous damage to walnut fruit. The weevils lay their eggs in the young fruit and the grubs bore into it and pupate inside the fruit. The attacked fruit drops. In some cases not a single fruit remains on the tree.

Bemisia gossypiperda, Misra & Lamba (Aleurodidae : Hemiptera) has been attacking cottons for the past few years. The eggs are laid mostly on the under side of leaves and the nymphs mainly confine themselves to the underside also. The life-cycle during April to September is 14-27 days, during October-November 36 days and November to February 97-107 days; there are a number of broods on cottons. This pest has numerous alternative food plants. It is interesting to note that the attacked leaves do not show any malformation such as drying, wrinkling or curling.

Latvia: Plant Diseases observed in 1930 (2).

Crop diseases have not appeared in epidemic form during 1930. It should be mentioned that the destruction of barberry and buckthorn prescribed by the law of 20 March 1930 (cf. this *Bulletin*, 1930, No. 8, p. 126) has been started on a large scale. To encourage the control of *Fusarium* on rye considerable quantities of fungicides have been distributed at State expense.

(1) Communication from the official correspondent of the Institute, Mr. M. Afzal HUSAIN, M. A. (Cantab.), I. A. S., Locust Research Entomologist to the Imperial Council of Agricultural Research Punjab Agricultural College, Lyallpur.

(2) Communication from the official correspondent of the Institute, Prof. Max EGLITS, Phytopathological Laboratory of the University, Riga.

In several districts *Cladosporium herbarum* (Pers.) I.k. attacked winter wheat. Serious damage has been caused to *Ribes* spp. by *Puccinia ribesii caricis* Kleb. and to chrysanthemums under glass by *Oidium chrysanthemi* Rabenh. *Cladosporium fulvum* Cooke, which attacks tomatoes under glass, is gradually spreading.

In the autumn of 1930 the presence of bunt of wheat (*Tilletia laevis* Kühn) was reported for the first time in this country. It seems as though the disease was introduced in 1929 with the seed wheat which had to be imported in consequence of the bad crop of 1928.

The following fungi must be reported as new to the flora of Latvia :— *Uropyxis sanguinea* Arth. on *Mahonia Aquifolium* Nutt. at Riga ; *Diplodina Lini* Moesz and Smarods on flax in the district of Walk ; *Ramularia Coriandri* Moesz and Smarods on *Coriandrum* spp. in the gardens of the horticultural firms of Riga ; *Exobasidium discoides* Ell. on *Azalea* sp. under glass ; *Physalospora Cydoniae* Arn. on *Pyrus Malus* L. and *P. communis* L. in the nursery gardens.

Hellenic Republic : Outbreak of *Heliothis armigera* Caterpillars on Crops in Macedonia (1).

Cotton plantations in the communes of Arapli, Doudoular and Epanomi in the Salonica region were infested in 1930 by caterpillars of *Heliothis armigera* Hbn. which destroyed nearly the whole crop. The plantations of the Communes of Arapli and Doudoular cover an area of 400 hectares, 200 of which are irrigated ; those of Epanomi cover 500 hectares and are not irrigated.

The caterpillars damaged also the crops of maize, tomatoes, egg plant, piments and French beans in these Communes. They also caused losses estimated at 25-60 per cent. of the crop in cotton plantations in the region of Véria, Macedonia.

The caterpillar attacks maize by preference and then cotton. In regions where maize fields were interspersed among the cotton plantations the latter were very little attacked, while the cobs of the early varieties of maize were completely destroyed.

The caterpillars when young feed on the leaves of the cotton plant ; later they attack the flower buds and young bolls, which they leave just before they fall to carry on their destructive activities elsewhere.

In a cotton plantation near the railway station at Naoussa no caterpillars were found, although they were present in nearby small plots of maize, tomatoes and tobacco.

Larks literally decimated the caterpillars. In one cotton plantation which was visited by a flock of larks not one caterpillar survived ; in a neighbouring plantation which was not visited by larks the number of caterpillars was not diminished.

As a result of these observations the following measures seem indicated in order to reduce the damage of this pest. Early maize should be grown in cotton plantations as a trap plant. Cotton plantations should be sprayed or dusted with arsenical insecticides very early when the caterpillars are scarcely visible and are feeding on the leaves, before they penetrate into the bolls. Birds, and particularly larks, must be protected.

The above observations were made by the Inspector of Agriculture at Salonica and the Agricultural Service at Vermion, Macedonia.

(1) Communication from the official correspondent of the Institute, Mr. C. A. ISSAKIDES, Technical Advisor to the Minister of Agriculture, Athens.

Hellenic Republic : Control of Field Voles (1).

In 1930 in several of the wheat growing plains of the Hellenic Republic field voles increased to such an extent that they became a menace to the cereals and potato crops.

Amongst the regions particularly infested may be mentioned Langada and Katerini in Macedonia, the plains of Thessaly, Phthiotis and Phocis, the vicinity of Thebes, several districts in the Departments of Arcadia and Messenia, in the Peloponnesus and the island of Euboea, and the Department of Candia in Crete.

The rainfall last autumn was not abundant, which was the principal factor favoring the multiplication of the voles.

The campaign against them in the Hellenic Republic was carried on mainly with the use of oats and rye grain poisoned with nitrate of strychnine. The poisoned bait was prepared by soaking 1000 kilos of grain in a solution of 12.5 kilos of nitrate of strychnine until the liquid was completely absorbed by the grain.

The Phytopathological Service of the Ministry of Agriculture supplies the poisoned grain free. Producers in the infested regions are obliged to conform to Law No. 512 relating to the control of voles and locusts. The Phytopathological Service has already distributed about 25 tons of poisoned grain and expects to supply a further 75 tons.

The poisoned grain is an effective and economical means of control in winter when grass is scarce. About 10 grains are thrown into each vole hole.

The Phytopathological Service uses other control methods in addition to poisoned grain. The Danysz virus, prepared in the Microbiological Laboratory of the Ministry of Agriculture, is utilised in particular.

It also procures 'Delicia' and 'Hora' fuses (German products) which when lighted produce a heavy asphyxiating smoke. A fuse is inserted in the top of a metal cylinder which is introduced into the mouth of a vole run. When the smoke begins to emerge from neighbouring holes they are all stopped up, and the voles within are thus asphyxiated. One fuse is sufficient for several runs. The Phytopathological Service procured 250 cylinders and 25,000 'Delicia' fuses and as many 'Hora' fuses and cylinders.

This method is more costly than the poisoned grain method, but has the advantage of being effective in all seasons, in particular in spring when voles are more attracted by the young grass than by the poisoned grain.

Turkey : Natural Enemies of the Desert and Italian Locusts (2).

During the last anti-locust campaign the directors of the control operations observed that a fly (*Stomatorrhina lunata*) was abundant in the breeding grounds of the Desert locust (*Schistocerca gregaria*). Thousands of small larvae were found in the soil with the locust eggs. This insect destroyed in certain regions as many as 50 and even 75 % of the eggs.

The Italian locust (*Calliptamus italicus*) is the most widely spread locust species in Turkey. It is a pest on various crops in certain years. During rainy years

(1) Communication from the official correspondent of the Institute, Mr. C. A. ISSAAKIDES, Technical Advisor to the Minister of Agriculture, Athens.

(2) Communication from the official correspondent of the Institute, Mr. M. SUREYA, Councillor of State, Angora.

the fungus *Empusa Grylli* appears and parasitises the locusts. Last year, for example, at Samsoun this fungus decimated the swarms so that the region was completely rid of locusts.

In 1930 in the province of Ismit after the abundant rains of May and June the locusts were attacked by the disease and were wiped out within a few days.

LEGISLATIVE AND ADMINISTRATIVE MEASURES

Germany (1). — An Ordinance of 30 September 1930 establishes the new list of custom houses by which, in so far as it is permitted, potatoes may be imported.

*** The names of the Bureaux of the German Plant Protection Service and the officials authorised to issue phytopathological certificates for exportation of plants and in particular of potatoes are given in two annexes to No. 12(1930) of the *Nachrichtenblatt für den Deutschen Pflanzenschutzdienst*.

*** An Ordinance of 22 September 1930 concerning the control of the potato eelworm (*Heterodera schachtii* f. *solani* called also *H. rostochiensis*) in Thuringia enacts that any outbreak or suspected outbreak of infection with this eelworm must be immediately reported to the local authorities who on their part shall notify the higher authority and the Plant Protection Station at Jena. Land shall be declared infected on which the potato eelworm has been found; neighbouring land shall be declared "in danger". Potatoes grown on land infected or "in danger" may not be used as seed. Potatoes must be cooked before being used for food. Potatoes may not be exported beyond the boundaries of the Communes in which the potato eelworm has been found to be present.

Cellars and other places in which potatoes coming from infected land have been stored must be thoroughly cleaned and disinfected with a soapy solution of 2 % cresyl. All remains of potato plants in districts which are infected or "in danger" must be collected and burnt; it is particularly forbidden to throw them on compost or manure heaps.

During 5 years after the ascertaining of infection land which is infected or "in danger" may not be planted with potatoes, tomatoes or other plants liable to be attacked by the potato eelworm.

*** By virtue of the Police Ordinance of 4 October 1930 for the control of asparagus rust [*Puccinia Asparagi*] in Thuringia any person growing asparagus is obliged before the beginning of October in each year to cut and burn all green shoots of asparagus. As soon as the first symptoms of the disease appear in spring (May and June) affected stems shall also be cut and burnt.

(1) Communication from the Biologische Reichsanstalt für Land- und Forstwirtschaft, Berlin-Dahlem, official correspondent of the Institute.

Barley seed	{ <i>Ustilago Hordei.</i>
	{ <i>Ust. nuda.</i>

Wheat seed	<i>Ust. Tritici.</i>
Cotton seed	{ <i>Platyedra gossypiella.</i> <i>Anthonomus grandis.</i>
Maize seed	<i>Ust. Maydis.</i>
Maize stalks and heads	Caterpillars of the stalks and heads.
Potatoes	{ <i>Epitrix cucumeris.</i> <i>Doryphora (Leptinotarsa) decemlineata.</i> <i>Phthorimaea operculella.</i> <i>Actinomyces Scabies.</i> <i>Phytophthora infestans.</i> <i>Synchytrium endobioticum.</i>
Onions	<i>Urocystis Cepulae.</i>
Seeds of fodder plants	Dodder.
Citrus fruits.	{ <i>Lepidosaphes gloverii.</i> <i>Aleyrodes citri.</i> <i>Bacterium Citri.</i> <i>Corticium salmonicolor.</i> <i>Sphaeropsis tumefaciens.</i> <i>Gloeosporium limetticolum.</i>
Any fresh fruit	{ <i>Aonidiella pernicioso.</i> <i>Laspeyresia molesta.</i> <i>Diaporthe pernicioso.</i>
Plants and fruits of pineapple	{ <i>Thielaviopsis paradoxa.</i> <i>Fusarium cubense.</i>

(*Bollettino Ufficiale della Colonia Eritrea*, Asmara, 31 gennaio 1931, anno XL, n. 2, p. 68).

Italy. — In consequence of the serious damage caused by the European corn borer (*Pyrausta nubilalis* Hübn.) to maize crops in the provinces of Udine, Treviso, Venice, Padua, Rovigo and Ferrara a Ministerial Decree of 20 January 1931 enacts that farmers and owners of land under maize in the provinces mentioned shall before 15 April of every year provide for the use as litter of all maize stalks and for their removal to manure pits; they may also use them as fuel or fodder or cause their disappearance in any other way provided that the destruction of the caterpillars of the corn borer is guaranteed. This applies to stalks already cut and stacked as well as to those still standing.

The stalks must be either pulled up or cut at or even below the level of the soil, in such a way that no trace remains visible. Only in exceptional cases and on the recommendation of the Director of the Regional Phytopathological Observatory may the stalks be ploughed in.

Maize stalks which after 15 April of each year shall not have been destroyed or utilised by one of the methods mentioned above shall be immediately burnt if they

are already cut and stacked, or cut at or below soil level and then burnt, at the expense of the defaulter, who shall be punishable under the regulations in force.

The exportation of maize stalks from the provinces mentioned is prohibited (1).

**. The Ministry of Agriculture and Forests has published a list of the Communes declared to be infected with, or suspected of infection with, grape phylloxera up to 31 December 1930, from whose territory the exportation of certain plant products is prohibited in conformity with Law No. 94 of 3 January 1929 (see this *Bulletin*, Year III, 1929, No. 2, pp. 22-28). (*Bollettino Ufficiale del Ministero dell'Agricoltura e delle Foreste*, Roma, 1^o febbraio 1931, anno III, n. 3, pp. 307-335).

Peru. — Since the West Indian fruit-fly ('mosca de la fruta', *Anastrepha fraterculus*) is apparently absent from the valleys of Moquegua, Locumba, Sama and Tarata, by 'resolución' of 1 December 1930 the importation by the port of Ilo into these localities of oranges, cherimoyer and other fruits from the valley of Azapa, Chile, and of mangoes, oranges and cherimoyer fruits from the different valleys of the country is prohibited.

The export of fruits and vegetables produced in the valley of Tacna and intended for Moquegua, Locumba, Sama and Tarata is allowed on condition that they are inspected by the Agronomic Station of Tacna, which will in each case issue the necessary sanitary certificate free of charge.

The exportation of peaches, quinces, pears, apples, guavas, tomatoes, aubergines, gourds and garlic capable of carrying the insect mentioned above is prohibited. (*La Vida Agrícola*, Lima, (Perú), 1931, vol. VIII, no. 86, págs. 79 a 80).

**. In order to defray the expense occasioned by the control of the West Indian fruit-fly in the valley of Tacna a 'resolución' of 1 December 1930 has authorised the Agronomic Station of Tacna to levy on all exporters of fruits and vegetables produced in the valley a tax of 2 gold 'soles' (S/o 2.00) per ton of inspected merchandise as dues for the issue of the requisite official sanitary certificates. (*Ibid.*, pág. 80).

**. In consequence of the absence of the Mediterranean fruit fly ('mosca de la fruta del Mediterráneo', *Ceratitis capitata*) from Mexico, by 'resolución' of 11 December 1930 Art. 1 of the 'resolución suprema' of 2 August 1929 has been modified in such a way that the importation into Peru of fresh fruits and vegetables from the United States of America (except the States of California, Oregon and Washington), Central America, the West Indies, the Bermudas and the Hawaiian Islands alone remains prohibited. (*Ibid.*, pág. 80).

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INTERNATIONAL BULLETIN OF PLANT PROTECTION

DISCOVERIES AND CURRENT EVENTS *

South Australia : Notes on Plant Pests during 1930 (1).

Heterodera schachtii Schm. was prevalent in some districts during the winter months on oats, wheat and barley.

Penthaleus destructor Jack (*Halodictya destructor* Tucker) has been observed in small numbers in a few districts in the State on garden plants but has not occurred in an epidemic form. It favours chick weed, *Stellaria media* and cape weed, *Cryptostemma calandulaceum*.

'White grubs' of undetermined species have been troublesome on pasture areas in the South-East areas of the State.

Sminthurus viridis Linn. has been troublesome in certain districts on lucerne and Subterranean clover, but in certain other districts not so serious as is the case in some years.

Capitophorus fragariae Theob. was recorded on strawberries, this being the first record for South Australia. The colonies disappeared with the approach of the warmer spring weather.

Eritrea: Locusts (*Schistocerca gregaria*) (2).

During the first ten days of January 1931 locust eggs were deposited in the vicinity of the village of Addis Addi, of Abut, Gamà and Ogdalò in the Agambussa. Hatching of hoppers ('cucubtà') continued meanwhile at Zula, along the Genfaile stream and in the Car, and at Mersa Taclai in the eastern plain.

A dense swarm of young locusts coming from the north-east was reported from the residence of northern Dancalia on 19 January. On 20 January the same swarm was observed over the peninsula of Bari flying towards Arafali.

On the 23rd a number of pink locusts coming from over the Abyssinian frontier flew over the zone of Gharre Uoddi to the north-west of Assab.

Although throughout the territory to the south of Massaua all the hoppers reported up to last month were killed by emergency control gangs, to the north there

* In this, as in the next two chapters, the countries are arranged in French alphabetical order.

(1) Communication from the official correspondent of the International Institute of Agriculture, Dr. James DAVIDSON, Entomologist, Waite Agricultural Research Institute, Glen Osmond, South Australia.

(2) Communication from the official correspondent of the Institute, Dr. A. DE BENEDICTIS, Capo dell'Ufficio Agrario della Colonia Eritrea, Asmara.

exist some breeding places, but as they have already been located they will be destroyed without delay.

United States of America: Outstanding Entomological Features (I).

The present notes refer to the period January and February, 1931.

During the very warm weather of late January and early February, reports were received from Missouri and South Dakota of emergence of grasshoppers (Acrididae). It was at first believed that this was precocious hatching, but later evidence seems to indicate that it was merely the emergence from hibernation of such species of grasshoppers as spend the winter in the early nymphal stages.

This same warm weather resulted in reports of the appearance of cutworms (Noctuidae) in Missouri, and we also have a report of damage to strawberry buds by cutworms late in February on Bainbridge Island in Washington State.

An interesting observation of the successful hibernation of the pupae of the corn ear worm (*Heliothis obsoleta* Fab.) at Columbia, Mo., has been received. These pupae were alive when the report was made, in the last week of February.

The sugarcane borer (*Diatraea saccharalis* Fab.) appears to have passed the winter in very good condition in Louisiana, though the population that entered hibernation is reported as having been small.

Eggs of the rosy apple aphid (*Anuraphis roseus* Baker) seem to be prevalent enough in Pennsylvania to indicate trouble, while in southern Virginia they are so scarce that the entomologists are recommending omitting the aphid treatment in early sprays.

The San Jose scale (*Aspidiotus perniciosus* Comst.) still seems to be on the increase along the Atlantic seaboard from Pennsylvania to Georgia and westward over the Gulf region.

Reports of very successful hibernation of the codling moth (*Carpocapsa pomonella* L.) have been received from the New England, Middle Atlantic, South Atlantic, and the southern part of the East Central States.

The vegetable weevil (*Listroderes obliquus* Gyll.) has been reported from practically the entire infested territory as affecting winter truck crops.

The spotted cucumber beetle (*Diabrotica duodecimpunctata* Fab.) is reported as doing more or less damage in the Gulf region. This condition, however, is not unusual. The banded cucumber beetle (*Diabrotica balteata* Lec.) is reported as quite generally distributed over Florida. Although known for several years from the western part of the State, it is a new pest on the peninsula. The western spotted cucumber beetle (*Diabrotica soror* Lec.) started leaving winter quarters during late January in Oregon.

The asparagus miner (*Agromyza simplex* Loew) is reported for the first time from southern California. It has been known for some time as a pest in the San Joaquin and Sacramento Valleys.

A heavy migration of the turnip aphid (*Rhopalosiphum pseudobrassicae* Davis) was observed in Galveston County, Texas, on February 2.

During the last week in January and the first week in February, the European earwig (*Forficula auricularia* L.) was observed active at several points in Oregon.

(1) Communication from the official correspondent of the Institute, Mr. J. A. Hyslop, Senior Entomologist in Charge, Insect Pest Survey, Bureau of Entomology, United States Department of Agriculture, Washington, D. C.

India: Notes on *Thrips tabaci* (*Heliothrips indicus*), a Pest of Onion and Chillies (1).

Thrips on Onion.

(A) Results obtained by cultural methods for the control of Thrips :—

(1) Multiplication of Thrips is proportionate with the growth of the plant and therefore weakness of plants is not a predisposing factor for the rate of increase of Thrips on onion plants. Stimulating the plant by manuring although it does not reduce the number of Thrips, per unit of exposed area, however enables the plants to withstand the attack better.

(2) Excess of nitrogen over other manurial ingredients acts as a predisposing factor for the rate of increase of the insects and the plant itself withstands the attack rather badly.

(3) Since better growth results in better withstanding power, any factors that act as stimulant to the growth of the plants, will impart to the latter greater power to withstand the Thrips attack. Such factors probably are :—

(a) Lime — Which reduces the hydrogen ion concentration of our ordinary soil.

(b) Complete fertiliser — Taking care that the proportion of nitrogen does not exceed a certain limit. Phosphate appears to be deficient in our ordinary Poona soils in respect to this crop. If superphosphate is used as a source of phosphatic ingredient, then it is advisable to use lime or any basic fertiliser to neutralise the acidity of the former. Application of oil seed cakes which contain a fairly large amount of phosphorus in addition to nitrogen, and farmyard manure are severally or jointly preferable to the application of sodium nitrate alone or in excess in conjunction with farmyard manure.

(c) Sterilisation of soil may be practised with good results if economical.

(B) Remedial and preventive measures :—

(1) Application of kerosine oil emulsion (new method) as an insecticidal spray in two doses between 6.30 a. m. to 8.30 a. m. at the interval of 4 to 5 days is the most economical measure found out so far.

(2) Clean cultivation is also an essential factor in suppressing the attack of Thrips which are found on a variety of crops and weeds.

Thrips on Chillies.

Technique of finding ova in the tissues of the leaf :—

Various methods were attempted to locate the eggs inside the oviposition media of chillie leaves but all failed to show the eggs in a convincing manner. Some of the methods that were tried may be enumerated as (1) Holding the leaves against light : Transparent specks were seen but that could not be taken as conclusive proof, (2) Examining the leaf under microscope, (3) Taking microtomic sections of the leaf, (4) Bleaching leaves with free chlorine evolved by the combination of HCl plus calcium hypochloride and subsequently dehydrating and clearing in clove oil, etc.

Finally, however, treatment of Chillie leaves with xylene as a clearing agent has enabled the eggs to be seen in an unmistakable manner. Even the embryo contained in the eggshell is made vividly visible under the microscope. Treat-

(1) Communication from the official correspondent of the Institute, Mr. T. N. JHAVERI, L. Ag., Assistant Professor of Entomology, College of Agriculture, Poona, India.

ment of leaves by xylene method has shown therefore that the eggs are inserted in rather slanting position, generally towards the mid-area of a leaf. Eclosion takes place by a circular opening, not unlike one we find in cyclorhaphous puparium. We can now easily distinguish between hatched or unhatched eggs when seen under microscope. There are found two kinds of transparent spots on chillie leaves, some large and others so small as to be with difficulty discovered with the naked eye. The former are caused by the laceration of leaf tissue by the feeding of Thrips while the latter represent the anterior end of the eggs that are not buried too deeply. It is not possible to distinguish eggs buried more deeply than the epidermis.

Xylene method may be used to spot intro-tissue eggs as well as miners.

VARIOUS QUESTIONS

Locust Conference held in Cairo from January 31st to February 4th, 1931.

The following members took place in this Conference: — Messrs. H. V. King, Government Entomologist, Khartoum, C. Bodkin, Director of Agriculture, Jerusalem, Sobhi Bey el Hassibi, Director of the Locust Bureau, Damascus, Sheikh Fawzan el Sabek, representing Nejd and Hedjaz, E. Ballard, Chief Plant Pathologist, Ministry of Agriculture, Egypt, Kaimakan I. H. C. Hutton Bey, Frontiers District Adm., Egypt, A. M. Mistikawi Eff., Senior Entomologist, Ministry of Agriculture, Egypt, M. S. El Zoheiri Eff., Entomologist, Ministry of Agriculture, Egypt, Dr. A. De Benedictis, Head of R. Ufficio Agrario of Eritrea, apologised.

After careful discussion the Conference agreed unanimously to the following points:—

(1) That in view of the connection which the study of locust movements has established between the Sudan, Eritrea, Arabia, Palestina, Transjordan, Syria, Egypt and Turkey, it is incumbent upon all these countries to prevent locusts breeding throughout their territories. We cannot conceive a better slogan than the one which runs as follows:—

'A dead locust is a good locust, poisoned, burnt, beaten or buried'.

(2) It will be realised that the principles of locust warfare are those of human warfare, in that the best defence is to attack. The protection of the crops of the Nile Delta should not be attempted by awaiting the arrival of locusts in the Delta but by preventing them from breeding anywhere within Egyptian territories *i. e.* by carrying out an extensive campaign against hoppers in Sinai Peninsula and other desert regions where they occur.

(3) The advent of locusts would not be awaited before preparations are made *i. e.* there should always be adequate supplies of materials and apparatus for dealing with a locust invasion in any country where locusts are liable to occur.

(4) It would be a mistake to abandon the biological study in the intervals between locusts years. This work should be continued.

(5) It is most desirable that information should be obtained on the seasonal occurrence of the Desert locust together with meteorological data from Arabia.

(6) About methods of control it was agreed that the cheapest and most effective is the poison bait and should be looked on as the standard method.

A very valuable auxiliary is the metal barrier (whether zinc or tin).

In certain cases and under proper control the flamegun, although expensive in use, is a most valuable weapon for dealing with flying swarms. In special circumstances also the ploughing of egg areas has proved efficacious when carried out immediately after oviposition.

The use of smoke for the protection of valuable crops from flying locusts in restricted areas might be recommended.

Generally speaking the use of aeroplanes is of value for transport of Senior officers when inspecting a large area, and possibly in certain circumstances for collecting information from scouts by means of ground signals.

No opinion on their use for scattering bait can be given until experiments have been carried out but under the conditions obtaining in the desert it is unlikely that they can be used with any degree of economy.

International Diplomatic Conference for the Protection of Birds useful to Agriculture.

The International Institute of Agriculture has for a long time taken an active interest in the question of the protection of birds, and in particular of birds useful to agriculture.

The IInd General Assembly of the Institute (1909) discussed the subject and adopted conclusions to the effect that the Institute should take active steps to approach the Governments with a view to the complete execution and success of the International Convention for the Protection of Birds Useful to Agriculture signed at Paris 19 March 1902, and in general that the Institute should collect information as to the manner in which the said Convention is applied, both from the legislative and technical standpoints.

The question was again considered by the IIIrd General Assembly of the Institute (1911) and should have come before that of 1920. But events at that time scarcely allowed of insistence on the question and things were left as they were, although the Institute for its part continued to amass documentation as regularly as possible.

Since that time, however, the desire has been repeatedly expressed that a general revision of the Paris Convention should be undertaken, such revision becoming, according to experts and interested persons in different countries, of increasing utility.

The International Institute of Agriculture has therefore decided in virtue of the powers conferred by the International Convention of 7 June 1905 to propose to the adhering Governments to call and hold under its auspices an International Diplomatic Conference for the purpose of drawing up a new Convention, modifying and completing where necessary the Paris Convention now in force.

The date of the Conference has been fixed for October 1931. It will take place in the Netherlands the Government of the Netherlands being willing to give hospitality to the Conference.

LEGISLATIVE AND ADMINISTRATIVE MEASURES

French Colonies. — By Ministerial Decree of 1 December 1930 Art. 6 of the Ministerial Decree of 22 February 1926, concerning the introduction of cotton seed into the French Colonies by reason of the pink bollworm of cotton [*Platyedra gossypiella*], has been modified as follows :—

'The regulations of the present Ministerial Decree are applicable to the products named in Art. 1 and intended for importation into or transit through any French possession, excepting Madagascar, New Caledonia and Indochina.

'The regulations of Art. 1 of the present Ministerial Decree are applicable to the products named coming from Egypt, British West Africa, the old German East Africa, Nigeria, Sierra Leone, Asia, Brazil, Mexico, the Hawaiian Islands, the British West Indies, the following North American States, — Texas, Louisiana, New Mexico — Greece, Algeria, Tunisia, Morocco, Madagascar, New Caledonia and Indochina, also from countries in which the importation of such products is not prohibited nor subject to phytopathological control.' (*Journal Officiel de la République Française*, Paris, 11 décembre 1930, LXII^e année, n° 290, p. 13562).

Spain. — By 'Real orden' of 26 November 1930 and on the request of the authorities and the owners of oak plantations in the valley of Los Pedroches (Córdoba), the Director of the Laboratory of the 'Fauna Forestal Española, Piscicultura y Ornitología', D. Manuel Aulló y Costilla, Ingeniero Jefe de Montes, has been made responsible for the organisation, direction and execution of control measures against *Lymantria dispar* L., which spread in 1930 over an area of over 10,000 hectares.

In connection with the control campaign an association of owners of oak plantations has been formed in the commune of Villanueva de Córdoba. This is the first association of the type in Spain. (*Revista de Biología Forestal y Limnología*, Madrid, 1930, año II, serie A, núm. 3, págs. 53 a 55).

France. — By Ministerial Decree of 24 March 1931 the introduction into French territory of coniferous plants or their parts the importation of which is authorised under the conditions prescribed by Ministerial Decree of 26 November (see this *Bulletin*, 1931, No. 2, p. 28) may be effected only by the customs offices of Dunkirk, Tourcoing, Strasbourg (Kehl), Ventimiglia, Marseilles and Bordeaux.

Direct transit without restrictions regarding point of entry of plants and plant parts of any coniferous species is authorised subject to the control measures taken by the customs administration. Packages must be such that no part of their contents can come unpacked in course of transport. (MINISTÈRE DE L'AGRICULTURE, DIRECTION DE L'AGRICULTURE. *Bulletin de l'Office de Renseignements Agricoles*, Paris, 1^{er} avril 1931, n° 7, p. 117).

Italy. — A similar compulsory association ('Consorzio obbligatorio') to that formed in 1929 at Cividale (cf. this *Bulletin*, Year III, 1929, p. 39) has been established, also for a period of nine years, at Maniago among fruit growers (land owners, tenant farmers or 'metayers') of the communes of Fanna, Maniago, Cavasso Nuovo and Frisanco (province of Udine). The purpose of the association is the control of the following plant and animal pests of fruit trees :— *Nectria ditissima*, *Carpocapsa pomonella*, *C. funebrana*, *Aporia crataegi*, *Porthesia chrysorrhoea*, *Hyponomeuta*

malinellus, *H. cognatellus*, *Lyda pyri*, *L. nemoralis*, *Fusicladium dendriticum*, *F. pyrinum*, *Monilia fructigena*, *Gnomonia erythrostoma*, aphides, *Cossus cossus*, *Zeuzera pyrina*.

Morocco (French Zone). — By Decree of the Directeur Général de l'Agriculture, du Commerce et de la Colonisation of 19 February 1931, concerning phytosanitary measures, the importation and transit of the products or objects enumerated in Art. 5 of the 'dahir' of 20 September 1927 (cf. *International Review of Agriculture*, New Series, Year XIX, 1928, p. 571) may take place only by the ports of Casablanca and Kénitra and by the frontier station of Oujda.

The said products or objects are on their entry into the French Zone of the Sherifian Empire submitted to sanitary inspection and, if necessary, are disinfected, fumigated, returned or destroyed.

Plants and plant parts, with the exception of seeds, fruits and vegetables other than potatoes, tomatoes and aubergines, must be accompanied by :—

(1) a list of the botanic species and varieties contained in the consignment, certified in conformity with the trade invoice, specifying (a) the name and address of the consignor and of the grower's establishment; (b) the name and address of the consignee; (c) whether the grower's establishment is subject to State control; (d) the number, weights, marks and numbers of the packages; (e) the number of plants, if any;

(2) in the case of the products specified by Decree of the Directeur Général de l'Agriculture, du Commerce et de la Colonisation, a certificate of sanitary inspection conforming to the model annexed to the International Convention for Plant Protection (Rome, 16 April 1929) (cf. this *Bulletin*, 1929, No. 4, pp. 50-55). The said model is annexed to the present Decree.

To allow of the identification of each package there must be attached to each a ticket bearing the following information :—

(1) the full name of the consignor; (2) the locality, department or province and country of provenance of the contents; (3) the nature, variety and quantity of the contents; (4) the name and address of the consignee.

Each package must also bear a clearly visible mark and number.

Vine plants may not exceed 1m.50 in length and must be in bundles of not more than 200.

The entry of plants with soil is authorised only if packed in hermetically closed and sealed bags of impermeable material and with double seams.

Potatoes must be packed in new bags, boxes, barrels or hampers.

The officials of the Direction Générale de l'Agriculture, du Commerce et de la Colonisation responsible for the supervision of the sanitary condition of crops and the inspection of horticultural firms and nurseries are to indicate to the customs authorities the suitable control measures to adopt against plant parasites. These officials will also issue the sanitary certificates which must accompany products or objects intended for export.

The present Decree also establishes the conditions concerning the circulation of products coming from establishments subject or not to sanitary control. Cut flowers, fresh fruits and vegetables and their packing materials, soil, compost, dung and props may be freely circulated.

Exportation outside the French Zone of plants in pots or in soil and plant parts, cuttings, budwood, flower bulbs, tubers and rhizomes, also of cut flowers, requires a certificate of sanitary inspection. (EMPIRE CHÉRIFIEN. PROTECTORAT

DE LA RÉPUBLIQUE FRANÇAISE AU MAROC. *Bulletin Officiel*, Rabat, 3 avril 1931, XX^e année, n^o 962, p. 427-428).

* * By Decree of the Directeur Général de l'Agriculture, du Commerce et de la Colonisation of 19 February 1931, concerning the application of sanitary regulations to certain products of plant origin on their entry into the French Zone of the Sherifian Empire, the products enumerated below are admitted to importation or transit without restrictions concerning the place of entry and are not subject to sanitary inspection, disinfection, fumigation, return or destruction :—

- (1) Grain of the following cereals :—
 Wheat (cultivated species of the genus *Triticum*) ;
 Barley (cultivated species of the genus *Hordeum*) ;
 Oats (cultivated species of the genus *Avena*) ;
 Rye (*Secale cereale*) ;
 Maize (*Zea Mays*) ;
 Rice (*Oryza sativa*) ;
- (2) Seed of :—
 French beans (*Phaseolus vulgaris*) ;
 Peas (*Pisum sativum*) ;
 Lentils (*Ervum Lens*) ;
 Broad beans (*Faba vulgaris*) ;
 Vetches (*Vicia sativa*) ;
- (3) Coffee beans (*Coffea arabica*, *C. liberica* and *C. stenophylla*) and green leaves of tea (*Thea chinensis*) ;
- (4) Black pepper (*Piper nigrum*) ;
 Cloves (*Eugenia aromatica*) ;
 Cinnamon bark (*Cinnamomum zeylanicum*) ;
 Ginger (*Zingiber officinale*) ;
 Galangal (*Alpinia officinarum*) and, in general, all spices other than pimento ;
- (5) Dried lavender (*Lavandula vera*, *L. latifolia*, *L. Stoechas*) ;
 Dried garden thyme (*Thymus vulgaris*), dried sarsaparilla (*Smilax sarsaparilla*), senna (*Cassia* sp.), seeds of anise (*Pimpinella Anisum*) and stellated anise (*Illicium anisatum*) ;
- (6) Gums, resins, gum-resins, incense, benzoin, resin of aloes, various nutgalls (Chinese galls, Takaout, oak galls, etc.) ;
- (7) Dried medicinal plants in packets ;
- (8) Blocks of wood, cork, bark, tan, poles, rods, railway sleepers, rough timber and firewood ;
- (9) Industrially dried vegetables, flours, food pastes, brans, oilcakes, straw and hay, with the exception of dried fruits (*Ibid.*, p. 428-429).

* * By Decree of the Directeur Général de l'Agriculture, du Commerce et de la Colonisation of 19 February 1931, the products or objects enumerated in Art. 5 of the 'dahir' of 20 September 1927 concerning phytosanitary measures for the plants submitted on entry into the French Zone of the Sherifian Empire to sanitary inspection, fumigation, disinfection or to return, must, within two hours of the completion of these operations be removed from the fumigation chambers, vats, buildings or other premises of the regional service of inspection for the protection of crops.

Consignees, or their representatives, of products or objects which have not been removed in accordance with these regulations are liable to the payment of a tax calculated according to the weight indicated on the customs declaration form and in the following manner :—

- (1) Two francs per hour per quintal of the raw product ;
- (2) Parts of an hour are calculated as whole hours.
- (3) Only the hours of storage included between the legal opening and closing hours of customs offices are taxable. (*Ibid.*, p. 429).

*** By Decree of the Directeur Général de l'Agriculture, du Commerce et de la Colonisation of 27 March 1931 the plant products specified below must on their entry be accompanied by a certificate of sanitary inspection :—

Plants in soil or in pots ;

Potato tubers, tomatoes, aubergines.

Certificates of sanitary inspection accompanying consignments of potatoes, tomatoes and aubergines must be in accordance with the regulations of the Decree of the Directeur Général de l'Agriculture, du Commerce et de la Colonisation of 25 May 1928, as modified by the Decrees of 9 November 1928 and 15 June 1929. (*Ibid.*, p. 429).

Mexico. — A Regulation of 12 December 1930 authorises the construction of aeroplanes for the control of diseases and pests of crops, and fixes the characteristics of the machines and the regulations for their use.

The Ministry of Communications and Public Works, in agreement with the Ministry of Agriculture and of the ' Fomento ', is authorised to collect a tax per hectare, as duty for service, which will be fixed in each case, taking into account the particular disease or pest, the area and distance of the land to be treated.

The Ministry of Communications and Public Works, on the recommendation of the Ministries of Agriculture and the ' Fomento ' and of Finance and Public Credit, will grant concessions to private persons or firms of Mexico desiring to provide for the construction or importation of the prescribed type of aeroplane. (*Diario Oficial*, México, 20 de diciembre de 1930, tomo LXIII, núm. 42, pág. 8).

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[The following chapters: — *Myxomycetes*; *Phycomycetes*; *Pezizales*; *Xylariaceae*; *Cercosporae*; *Ustilaginales*; *Uredinales*; *Eu-Basidiomycetes* have been prepared respectively by W. C. Muenschner; Wm. H. Weston, Jr.; Fred J. Seaver; J. H. Miller; Chupp; H. S. Jackson; F. D. Kern and H. H. Whetzel; L. O. Overholts. A review of literature is given on pp. 201-213. The 384 forms enumerated include various genera and species new to science (descriptions in English)].

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INTERNATIONAL BULLETIN OF PLANT PROTECTION

DISCOVERIES AND CURRENT EVENTS *

Algeria: Latest Locust Invasion (1).

In the spring of 1930 Algeria underwent an invasion of desert locust (*Schistocerca gregaria*) which had been foreseen by the Technical Services from the end of December 1929 as a result of accurate information supplied by the Anti-Locust Posts of the Southern Territories. Control measures have thus been decided on without hurry and the stocks of equipment and specially ingredients collected within the requisite time. Highly satisfactory results have been recorded everywhere.

DEPARTMENT OF ORAN. District of Tlemcen. --- The first swarm was reported in the district on 29 December 1929, to the S. W. of El-Aricha in the Ouled-Nahar. The acute cold of the night and collecting carried out during the day completely suppressed it. On 11 January 1930 another coming from Morocco halted at Port-Say, then crossed the territory of the Achaches, the N. W. part of the Beni-Ouassine and the M'sirda. On 24 January locusts coming from the mixed commune of Marnia began the invasion of the mixed commune of Nedroma to the Souhalia and the Beni-Menir, then little by little gained the west and north of the district. Their pink tint was already turning to a sienna colour. On 11 March some large swarms settled in the commune of Nemours in the valleys of the Oueds Ghazouana and Tléta. On the 29th of the same month the mixed commune of Remchi was in its turn infested, the pests being reported in the tribe of the Beni-Ouarsous, neighbouring Nedroma, at the foot of the Djebel-Sefiane and at Ras-el-Madher. From then on the invasion became rapidly worse. Eggs were marked down daily nearly everywhere. The locusts continuing their progress in the direction of the Tafna reached Montagnac and its outskirts and even the sea towards Rachgoun and Beni-Saf. On 24 April certain groups ascended the valley of the Isser to Sidi-Abdellys.

All the flying swarms up to the present recorded came from eastern Morocco. But from now on the situation became rapidly more serious because of a huge invasion looming up from the Southern Territories. In May this took considerable dimensions; swarms descended the valley of the Tafna, depositing eggs along their route, to Marnia, then turning to the N. W. extended over the territories of the M'sirda, the Souhalia, the Beni-Menir and the whole commune of Nemours. At the same time another dense swarm followed the valleys of the Oueds Chouly and Issers and stopped between the Abdellys and Aoubellil. Finally, on 8 June a last swarm

* In this, as in the next two chapters, the countries are arranged in French alphabetical order.

(1) Report of Mr. M. DELASSUS, Inspecteur de la Défense des Cultures, official correspondent of the Institute, transmitted by the General Government of Algeria (Direction de l'Agriculture et de la Colonisation).

arrived by way of the Tafna, bore to the east on its exit from the gorges of Medjahed and alighted on upwards of 1,500 hectares of the land of the Tureune colony.

District of Sidi-bel-Abbès. — After having been reported for the first time towards Oglat-Taerziza (mixed commune of Télagh) locusts appeared nearly simultaneously (24-25 April) at Rochambeau, Zegla and in the forest of Zid-el-Mounen (mixed commune of Télagh), then at Tirman (24 April), Télagh P. E. (28 April) Tassin, Parmentier, Sidi-Daho (1-5 May), Lamtar (5-6 May), Chanzy and Berthelot (7 May), Tabia (16 May), Palissy (17 May), Détrie (19 May), Bel-Abbès (20 May), Mercier-Lacombe (22 May), Boutin, Tenira, Mosser (20-22 May), Deligny and Prudon (1-6 June). On 6 June the locusts flew over the village of Trembles and disappeared in the direction of Oued-Imbert. Their progress was in 4 main directions:— by the Oued-Sefioun towards Berthelot, by the Oued-Melrir towards Tenira and Mercier-Lacombe, by the Oued-Mekerra towards Rochambeau, Tabia, Chanzy and Bel-Abbès. The fourth swarm coming from the W. S. W. seems to have been driven into one channel towards the N. E. after having come up against the mountains to the west of the Tessalah chain. According to the old planters of the region all previous invasions have followed one or other of these routes and more particularly the valley of the Oued-Mekerra.

District of Oran. — This was infested by locusts coming both from the districts of Tlemcen and Sidi-Bel-Abbès. The former swarms invaded the Aou-bellil douar (Aïn-Témouchent) on 3 May, the communes of the Trois Marabouts on the 8th, Turgot on the 13, Rio-Salado on the 21st and Er-Rahel on the 22nd; the others invaded the commune of Oued-Imbert on 11 June, certain small swarms towards the end of the month reaching even Saint-Denis-du-Sig, Bou-Henni, Moctadouz and Saint-Lucien.

District of Mascara. — The course of the invasion into this district followed two main routes:— the first by the valley of the Oued-Melrir; the locusts penetrated from 22 May into the mixed commune of Mascara and remained till the end of June successively in the regions of Melrir, Aïn Fras, the Oued-Hammam valley, Ouled-bou-Saïd, Bou-Hanifa; on 15 June small swarms passed into the commune of Doublinau. The second route was by the valley of the Oued Sefioun and its tributaries; the locusts which on 7 May had been seen at Berthelot (District of Bel-Abbès) reached the Hounet and Aïn-Manâa douars and deposited eggs there up till 15 May.

District of Mostaganem. — The first flying swarms made their appearance there in January in the mixed commune of Afrou. They then disappeared in the direction of Djelfa-Chellala and until 15 May the district was free of them. On this day locust bands settled in the Sersou penetrated into the department of Oran. These swarms coming from Vialar covered for a fortnight the north of the mixed commune of Tiaret (douars Ouled-Lakhred, Tida, Bechtout and Guer-toufa) and the south of that of Ammi-Moussa (douars Ouled-Bakhta, Maacem, Ouled-Berkame and Mekmène). The smaller ones following the valley of the Oued-Riou reached first Guillaumet on 25 May, then Ammi-Moussa and El-Alef on the 30th, Inkerman on 3 June and alighted finally in the mixed Commune of Renault.

A second swarm followed the valley of the Oued-Nasfa and infested the douar Ben-Louma of the mixed commune of Zeimora, deposited eggs at Kenenda and Zeimora and continuing its course arrived on 6 and 7 June at Relizane. Driven

by a strong southerly wind it reached the mixed communes of La Mina and Cas-saigne and finally the valley of the gardens (Mostaganem).

DEPARTMENT OF ALGIERS. District of Orléansville. — Towards 6 May the first flying swarms made their appearance in the mountains of Ouarsenis, invading first the douar of Beni-Chaïb (Djebel Arak, Djebel Arai, Djebel Ain-ben-Youcef, the valley of the Oued Mekeberta, Djebel Groune), then the douar Lardjem. From 6 to 16 May they followed in a N. E.-S. W. direction the valley of the Oued Fodda; on the 17th, 18th and 20th some sparse swarms were reported at Oued-Fodda, Carnot, Vauban; but the main column turning west near Lamartine invaded the douars of Beni-bou-Khannous, Marchoun, Tsighaout, then Orléansville (19, 21 and 13 May) by the Medjadjas; the advance guard reached the douars of the Heumis and Baghdoura (mixed commune of Tenès) and finally the sea, after having flown over the douars of Taourira and Beni-Haoua (5 June); this last mass followed the Oued Dahmous valley. Certain swarms of little importance separated off, however, at the start and after having passed over the douars of Beni-Ouazzan, Guerboussa, Sidi-el-Laroussi, Masséna, rejoined the first column by way of the Warnier gap without reaching the centre of Malakoff.

District of Miliana. — On 26 April the advance columns of very large swarms, following a general S. E.-N. W. direction and coming from the mixed commune of Chellala, alighted to the south of the mixed communes of Téniet-el-Haad and the Gersou. From then until mid May the locust invasion continued without interruption, always towards the N. W. over the whole of the Sersou. The territory of Bourbaki in the centre alone was spared. It marked also the point of bifurcation of the main wave, one branch extending widely over the centres of Victor Hugo (26-29 April), Hardy (26 April, 3 and 4 May), Burdeau (5 and 6 May) and Vialar (6 and 7 May). Bad weather, copulation and egg laying delayed the locusts there for ten days during which they made local movements spreading the contamination. Leaving this region they then reached the mixed commune of Chélif by way of the Oued Lardjem valley. The other branch following a route further east commenced at Taine, reached the 2 Marabouts, then Taza-Trolard, by the easiest gradient. Thus the greater part of the locusts turning at Téniet-el-Haad took to the valley of the Oued Tighzert near Taza and followed it until the confluence of the Oued Kremais which they then ascended. Describing a half loop they regained on 9 May before Marbot a S. E.-N. W. direction. Helped by the wind these swarms touched the mixed commune of the Braz and spread into the district of Miliana. At mid-day on 11 May Port-du-Caïd received their visitation, the region of Affreville was from that time directly threatened but the east wind starting to blow again diverted the movement of the column in the direction of the Oued-Zedine.

Besides these two main invasions another soon appeared towards the mixed commune of Djendel. The locusts arrived by the Chélif above the Gribbs dam. They came from the Boghari region. Held back by unfavourable weather they did not depart until 15 May, after which they made a sudden appearance at Borély-la-Sapie and Amourah on the banks of the Chélif.

At the same time some small swarms reached Lavarande, then Duperré, and setting off rapidly without causing damage arrived on 11 and 17 May at Levacher where they alighted for copulation and egg laying.

On 20 May the survivors set off again towards the north. Those from the Djendel followed up or crossed the Ganntas and were reported at Changarnier and Adélia on the 24th and 25th at Hammam-Rhira. Those from Levacher flew over the Bou-Maad into the valley of the Oued-Damous and reached the shore.

District of Médéa. — The first swarm coming from the S. E. penetrated on 3 April into the mixed commune of Chellala (douar Megane), alighted and began laying; one part almost immediately took flight again towards Rechaïga from where after a few days' stay it reached the Sersou (25 April). The remainder of the swarm, soon enlarged by others of varying size, followed the gullies of Gueltes-Stel, reached Aïn-Oussera on the 5th and settled in the Chabounia and Boughzoul douars of Boghari mixed, Birine, Zenzach and Bennehar of Aïn-Boucif. Bad weather then dispersed the swarms into small groups which were observed in succession in the douars of Oum-el-Djellil, M'fatah, Saneg and Ouled-Anteur. The most serious part of the swarm bore to the N. W. in the shelter of the highest mountains in the commune of Téniet-el-Haad. Starting on 5 May certain swarms driven by a violent wind blowing over the whole region followed the upper valley of the Oued Chélif and appeared some days later in the commune of Djendel, while others turning directly north arrived at Arthur, Tlétat-des-Douairs and Brazza (Berrouaghia mixed).

District of Algiers. — On 1 December 1929 the first swarm of red locusts coming from the badly contaminated territories of the Ouled-Djellal alighted in the mixed commune of Bou-Saada, near Aïn-Rich (douars of Ouled-Mohamed-el-M'barek), and remained until the 11th when part of the swarm flew away to the S. E. and part to the S. W. A second invasion from the same quarter occurred on 19 March (douar Roumana). On the 24th and 25th three swarms from the west settled, one in the Oules-Sidi-Brahim, one in the douar Mohamed-el-M'barek and the other in the douar of Sidi-Hadjères (Sidi-Aïssa), then shortly afterwards resumed their flight like the others towards the south. On the 31st locusts were reported over 500 hectares of the douars of Ouled-Sidi-Brahim; they departed again the next day in a northerly direction and alighted in the douar of Sidi-Hadjères, staying there until 4 April when as a result of bad weather they took flight towards the S. E. and were probably the swarm which the same day flew over Bou-Saâda. This commune was seriously contaminated from then on, for dense swarms invaded also the douars of Ouled-Gherib and Amara. From the 10th deposits of eggs were marked in many places. From 5 to 12 April the general migration towards the north was clearly apparent. On the 7th locusts settled on 600 hectares round the Kouba of Sidi-Hadjères; on the 11th more or less dense swarms alighted over the whole territory stretching from the south of the Ouled-Ameur douar (Bou-Saâda) to the north of Sidi-Aïssa and were increased from the next day by considerable bands advancing on a front of 70 kilometres. The region to the south of the Adaouaras was soon the most seriously invaded.

On 23 April the mixed commune of Aumale was in its turn invaded; swarms settled in the douars of Ouled-Djenane and Serdoun; others were also reported on the 26th and 27th in the douars of El-Mora and Intacen and it was probably portions of these same swarms which on these dates reached on one hand the douar of El-Euch of Tablat mixed, departing again without laying, and on the other El-Esnam (mixed commune of Maillot). Arrivals from the south continued; on 3 and 11 May locusts alighted again in this commune on the banks of the Oueds Hamsone, Anasser and Berdi and on the 4th even reached the commune of Akbou (Aït-R'zine) covering 10 hectares on the banks of the Oued-Bou-Sellam.

Part of the Algiers district was contaminated also by locusts from Djendel. Those which crossed the Gantas reached Meurad by way of Changarnier and Hammam-Rhira and deposited eggs near the dam; after a short halt they took flight again and alighted on 27 May on the Oueds Damous Arbil, Messelmoun and Touarès near

the centre of Marceau. Some secondary swarms followed them and passing by Zurich one part went by the Oued Bakora towards the Ghenoua and the commune of Chercell P. E. where it settled in some vineyards, and another part went towards Tipaza where it was reported on 6 June.

DEPARTMENT OF CONSTANTINE. District of Sétif. — Locusts were first reported here in the commune of M'sila. Coming from Barika they alighted on 15 March in the douar of M'cif, on 17 March on the outskirts of the centre, on 3, 4, 6 and 12 April in the douars of Saïda, Chellal, M'cif and Bou-Hamadou. Everywhere the swarms remained and their numbers were swelled by new arrivals from the south (Bou-Saâda) which increased their breeding grounds. On the 26th a large swarm left the commune and was reported some hours later in that of Maâdid at Céréz. Another swarm reached Galbois and the douar of M'barek on the 27th. The migration to the north continued during the following days. On the 27th eggs were already reported over 10 hectares in the douar of Zemmoura (Bibans). On the 30th a large new group coming from the south deposited eggs on 350 hectares in the Ouled-Taïer douar of the same commune; on 5 and 7 May smaller flights were still observed in the douar of Sidi-Amor.

In all the other communes of this district the invasion passed nearly unnoticed. Isolated locusts were reported almost everywhere during May but did no damage. One swarm only need be mentioned: coming from Barika it alighted on 26 April in the douar of Sou-Thaleb (Rhira); it was mostly destroyed and the survivors departed towards the north without even depositing eggs.

District of Batna. — In this district the invasion of desert locusts was of little importance. The mixed commune of Barika alone received a number of swarms from 26 January to 29 April, the chief egg deposits being in the vicinity of the oasis of M'doukal. In that of Belezma small swarms coming from the direction of the douar Oued-Aouf of Ain-Touta alighted on 4, 14 and 28 April in the douar of Merouana and laid eggs over fifty hectares. The commune of Ain-el-Ksar was not, properly speaking, invaded, and it was barely that on 2 May some locusts driven by a strong south-westerly wind reached Mezerr near the boundary of the commune of Batna.

AREA OF EGG DEPOSITS. — According to figures supplied by the Administrators of the mixed communes and the mayors the area covered by eggs of desert locusts in Algeria in 1930 reached 120,663 hectares.

INCUBATION PERIOD. — We have hitherto had as a guide only the somewhat inadequate data contained in KÜNCKEL, D'HERCULAIS' "Les sauterelles en Algérie" and the still less accurate reports of planters who have been present during previous invasions in various parts of Algeria. Last season has enabled us to collect valuable information on the subject. The incubation period depends on the time of laying, the exposure and the nature of the ground. Hatching occurs first on the slopes with a southern exposure and there first in the sandy light soils; it is less rapid in silico-calcareous soils, less still in heavy soils. The minimum period seems to be 15 days, the maximum 45 days.

DAMAGE. — Damage caused by desert locusts has been the subject of the most exaggerated reports. It thus seems of interest to give useful details on the matter. In general it may be said that control measures were carried out so rapidly and effectively that except in rare cases the damage everywhere was nil or insignificant. Such damage as occurred was mostly negligible and was almost always caused by

adults, against which the known means of control (night collecting, poisoned bait) give only relatively satisfactory results. It was the market gardens, which moreover are seldom important in the invaded regions, which were particularly attacked.

Eritrea: Locusts (*Schistocerca gregaria*) (1).

During February 1931 no hatching of hoppers was reported.

With the exception of a small swarm observed on the 2nd at Mai Abar, coming from the highlands and flying towards Nefasit, locusts were reported only over the coastal zone of the eastern plain.

On the 10th a swarm of nearly mature locusts coming from Ghedem flew over Zula in the direction of Arafali.

On the afternoon of the 18th red locusts of unknown provenance alighted in the territory of Mersa Fatma; on the 19th at dawn they took flight again in a south-westerly direction.

On the 20th a swarm was reported coming from Arafali and flying towards Massaua.

On the 23rd and 24th other swarms coming from Buri flew towards the territory of Gambussa.

In addition to the destruction of located breeding places by special gangs a constant watch is being maintained in all the localities of the eastern plain in which there is risk of further hoppers.

Turkey: Crop Pests during 1930 (2).

Cereals.

Microtus arvalis, *Apodemus flavicollis* and *Spermophilus* sp. These three mammals have caused much damage to cereal crops in Asia Minor. Satisfactory control was obtained by the use of the 'Hora' apparatus. Another effective and economic method of control consists in the use of grain poisoned with various chemicals. The Bacteriological Laboratories of Angora, Stanboul, Erzinjan and Mardin, which are under the Ministry of the Economy, are also studying control by virus.

Syringopais (*Scythris*) *temperatella*. The damage caused by this insect is reported to have diminished. It is a pest particularly of regions of ill-cared-for crops.

Zabrus gibbus was very abundant in a large part of the country.

Eurygaster. This genus is widely distributed in the country. Specimens collected in different regions have been identified by Dr. Horwath of Budapest. The species recognised are:— *E. austriaca* (Dardanelles) and its varieties *obliqua* (Adalia) and *frischii* (Adalia, Mersina), *E. integriceps* (Dardanelles, Stamboul) and its varieties *plagiata* (Angora, Smyrna) and *hellenica* (Adalia, Mersina).

Aelia. The species of *Aelia* occurring in the country are:— *Ae. acuminata* (Adalia, Mersina), *Ae. rostrata* (Adana) and *Ae. virgata* (Angora).

(1) Communication from the official correspondent of the Institute, Dr. A. DE BENEDICTIS, Capo dell'Ufficio Agrario della Colonia Eritrea, Asmara.

(2) Communication from the official correspondent of the Institute, Mr. M. SUREYA, Councillor of State, Angora, Turkey.

Tobacco.

Phthorimaea heliopa. This insect which originates in India has appeared in the Mediterranean region. In 1930 it did much damage, specially in the vicinity of Smyrna.

Anise.

Depressaria pimpinella. The anise crops were seriously attacked by this insect in the neighbourhood of Tekir-Dagh (Thrace).

Fruit trees.

The following parasites have been observed in the orchards of Angora on apricot and almond trees:— *Cimbex quadrimaculata* var. *humeralis* and *Diloba coerulescephala*.

Beet.

This crop was infested with *Cleonus* (*Bothynoderes*) *farinosus* (Thrace) and *Cassida seraphina* (Eski-sheer).

VARIOUS QUESTIONS

The Disinfection of Plants with Soil from the Standpoint of the Insect Fauna (1).

The danger of transporting insect pests in shipments of plants with soil about the roots, forwarded from one continent to another, is one that has been recognized for some time. Certain countries have already taken the extreme precaution of prohibiting the entry of plants with soil and others may be contemplating doing so. Such being the case, it would appear that countries largely concerned in exporting such commodities, would be well advised to contemplate instituting researches and investigations on this problem.

In a memorandum issued by the Federal Horticultural Board (1), it is stated that the State Entomologist of New Jersey had made a limited study of the insect fauna of balled plants imported from Europe, which resulted in the finding of over twenty different species of insects in the soil. In the same publication it is also stated that "There is risk of entry from foreign countries through the medium of such soil, of a vast number of insects, many of which have no relation to the plants imported but are possibly important enemies of field crops, such as clover, alfalfa, and other forage crops and grains. For example, there are more than a score of European weevils and root borers known to infest clover, alfalfa and related plants ... of the same nature are many insects which affect common truck (vegetable) crops, as the European mole cricket (*Gryllotalpa gryllotalpa*), European earwig (*Forficula auricularia*), and various wireworms (*Elateridae*)... There are also many important Euro-

(1) Communication from the official correspondent of the Institute, Mr. Arthur GIBSON, Dominion Entomologist, Entomological Branch, Department of Agriculture, prepared with the assistance of Mr. L. S. McLAINE, Chief of the Division of Foreign Pests Suppression and Secretary of the Destructive Insect and Pest Act Advisory Board, Ottawa, Canada.

pean fruit insects which can be introduced with soil about the roots of nursery stock. These include apple, pear and plum weevils, fruit and bud weevils, twig and stem borers and various leaf-feeding insects which hibernate in the soil".

In a circular (2) issued by the above organisation, it is stated that "one hundred and sixty-eight kinds of insects have been intercepted in soil accompanying foreign plants arriving in the United States from August 20, 1912 up to and including April 22, 1922. Of this number there are a dozen or more species of insects new to this country and which are recognized as injurious pests in foreign countries". Among the pests mentioned in this circular as having been intercepted are a wireworm (*Agriotes lineatus*), "which is considered a very injurious pest to cereal crops in Europe", and which was collected in soil from Finland; the so-called black pine weevil (*Brachyrhinus sulcatus*); was collected on several occasions from various countries; no less than six genera of weevils have been intercepted; and the European earwig and European mole cricket were undoubtedly introduced in soil accompanying plants.

The investigations of Morris (3) carried on at the Rothamsted Experiment Station on the insect and other invertebrate fauna of arable land, furnished some very interesting and important data. Samples of soil were taken from different plots and all insects and other invertebrates were recorded together with the approximate depth at which they occurred. Plot I, which had received 14 tons of barnyard manure per annum since 1843, had 15,100,000 invertebrates per acre, of which 7,720,000 were insects; Plot 2, which had received no manure since 1839, had 4,950,000 invertebrates per acre, of which 2,470,000 were insects. The greatest number both of insects and other invertebrates occurred in the upper three inches of soil, but some species were found in larger numbers at a greater depth. The greatest number of *Elatridae* larvae were found at a depth of five to seven inches and *Symphyla* at a depth of seven to nine inches, *Elatridae* larvae were found to the number of 198,653 to the acre in plot one, and 164,983 in plot two. Nine different orders of insects were represented in these collections. The fact that so many insects are present in the soil indicates the danger of shipping plants with soil, not only from the field, but also the use of such soil for potting greenhouse plants is one of considerable danger. The great increase in the number of insects present in the heavily manured land should also be noted. Undoubtedly such conditions exist in nurseries or in soil used for potting which is heavily fertilized.

A good deal of work has been done in investigating soil insecticides. Particular mention was made of the investigations of Leach in connection with the control of the Japanese beetle, *Popillia japonica*. According to Smith and Hadley (4), more than 40 chemicals have been used in treating infested soil balls, among them being ether, petroleum ether, toluene, acetic ether, nitrobenzene, chloroform and others. Carbon-bisulphide emulsion is now used extensively for the treatment of plants with soil about the roots, for Japanese beetle, including arborvitae, spruces, hemlocks, rhododendrons, azaleas, blueberries, hydrangeas, ferns and similar plants, besides numerous varieties of potted stock. The carbon bisulphide emulsion is also used for killing larvae in lawns or golf greens. Arsenate of lead (5) is used for mixing with the soil of flower beds or new lawns, at the rate of 1,500 lbs. to the acre, and soil so treated has remained grub proof over a period of five years.

Various toxic gases such as carbon bisulphide, carbon tetrachloride, sodium cyanide, naphthalene, paradichlorobenzene, etc. have been experimented with as a possible means of controlling the peach tree borer (6).

Calcium cyanide either in the dust or granular form has proved successful in controlling the cranberry root worm in cultivated blueberries (7). Essig (8) in Cal-

ifornia, first tried paradichlorobenzene as a fumigant for the Pacific peach tree borer (*Aegeria opalescens*) and then extended his investigations to the woolly apple aphid (*Eriosoma lanigerum*), the pear root aphid (*Eriosoma lanuginosum*), the grape phylloxera (*Phylloxera vitifoliae*), wireworms, and the garden centipede (*Scutigera immaculata*).

C. A. Thomas (9) of Pennsylvania in a bulletin recently issued reviews the research on wireworm control and lists a series of seed treatments investigated by many experimenters, including arsenic compounds, fluorine and copper compounds, mercury compounds, sulphur compounds, miscellaneous organic compounds, organic chemicals, etc.; and as contact insecticides against the larvae, mentions paraffin, tar oils, soap solutions, various emulsions, pyrethrum, tobacco dust, mustard and borax. Among the fumigants against the larvae are mentioned cyanides, carbon bisulphide and its emulsions, naphthalene, chloropicrin, paradichlorobenzene, petrol, benzene, toluene, cresylic acid, tetrachlorethane, pyridine, formaldehyde, ammonia, apterite and sodium sulphocarbonate.

In presenting a review of the present position with regard to soil insecticides, H. W. Miles (10), states that "The problem of controlling insects and allied animals which live in the soil and feed upon the underground portions of plants is one of the most difficult of the many problems which confront economic-entomologists at the present time... Although no soil insecticide for general application has been discovered, a number of chemicals are being used for the control of soil pests". He then reviews the damage caused by soil infesting insects on field crops, cereals, crops under glass, market gardens, etc. The results obtained by the use of various chemical substances is given, such as naphthalene, other coal tar products, hydrocyanic acid gas, corrosive sublimate, carbon bisulphide, formaldehyde and miscellaneous soil insecticides.

In preparing this memorandum no attempt has been made to cover the field in a comprehensive manner, but rather to point out the danger that does exist in the transporting of plants with soil from one country to another, and second, that the question of finding a suitable soil insecticide is a problem that has received the attention of workers in many countries. There is still much work to be done for the discovery of a general soil insecticide has not yet been made. It is not, however, merely the question of the insect fauna in soil that is cause for alarm but also the question of plant diseases.

As mentioned in the opening paragraph, there appears to be no question as to the advisability of instituting further researches in connection with this most important problem.

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LEGISLATIVE AND ADMINISTRATIVE MEASURES

French Colonies. — By Ministerial Decree of 2 February 1931, Art. 1 and paragraph 2 of Art. 7 of the Ministerial Decree of 3 December 1929 (see this *Bulletin*, 1930, No. 6, pp. 90-91) concerning the protection of cacao plantations in the French Colonies, have been modified as follows :—

'Article 1. — In the French Colonies specified in Art. 7 of this Ministerial Decree the importation, circulation, storage and transit are prohibited of plants, plant parts, pods and fresh beans of cacao, also of soil and packing materials accompanying them, coming either from countries where the presence of the disease known as witches' broom (' balai de sorcière ') and attributed to *Marasmius pernicius* has been proved or from any country where the importation of such plants or plant parts is not prohibited or submitted to phytopathological control'.

'Art. 7. —
'The prohibitory regulations contained in Art. 1 of the present Ministerial Decree are applicable to the products specified coming from South America, Central America, Mexico and the West Indian Islands'. (Ministère des Colonies. Institut National d'Agronomie Coloniale. *L'Agronomie Coloniale*, Paris, 1931, 20^e année, n° 158, p. 55).

Indochina. — By Decree of the Governor General, dated 10 January 1931, the Institute of Agricultural Research of Indochina includes among others the following establishments :—

North Indochina Section. — Phytopathological Division : Entomological Laboratory, Mycological Laboratory.

South Indochina Section. — Phytopathological Division : Entomological Laboratory, Mycological Laboratory. (Ministère des Colonies. Institut National d'Agronomie Coloniale. *L'Agronomie Coloniale*, Paris, 1931, 20^e année, n° 158, p. 54).

Italy. — A Ministerial Decree of 20 February 1931 enacts that the exportation of carnations from the provinces of Liguria to Germany may be allowed only if the flower stems have been freed from axillary leaves and flower buds and if the calices and flower stalks are not infested with *Tortrix prunubana*.

The Royal Regional Phytopathological Observatory for Liguria will undertake inspection and will certify the observance of this regulation. Any infringement will be punishable under Art. 26 of the Law No. 94 of 3 January 1929 (cf. this *Bulletin*, Year III, 1929, p. 28) (1).

* * * In accordance with the request presented by the Royal General Commissioner for the Control of Citrus Scales in Sicily and Reggio Calabria, by Ministerial Decree of 18 March 1931 cyanide of calcium, $\text{Ca}(\text{NC})_2$, has been officially recognised for use, alone or mixed with other substances, as a poisonous gas within the meaning of Art. 57 of the text of the laws of public safety approved by Royal Decree No. 1848 of 6 November 1926, and its use is subject to the provisions of the special regulation for the utilisation of poisonous gases approved by Royal Decree No. 147 of 9 January 1927 (cf. this *Bulletin*, 1927, No. 3, p. 41) in the same manner as the alkaline cyanides of potassium and sodium. (*Gazzetta Ufficiale del Regno d'Italia*, Roma, 4 aprile 1931, anno 72^o, n. 78, p. 1545).

Latvia (2). — List of the serious diseases, pests and plants the importation of which is forbidden (published in the 'Valdības Vēstnesis', No. 63 of 19 March 1931):

Diseases and pests of the apple:— *Eriophyes malinus*, *Blastodacna putripennella*, *Rhagoletis pomonella*, *Anisandrus dispar*, *Eriosoma lanigerum*, *Aspidiotus perniciosus*, *A. ostreaeformis*, *Lepidosaphes ulmi*, *Bacillus amylovorus*, *Bacterium tumefaciens*, *Pseudomonas papulans*, *Podospaera leucotricha*, *Glomerella cingulata*, *Nectria galligena*, *Physalospora Cydoniae*, *Nummularia discreta*;

Diseases and pests of the pear:— *Eriophyes piri*, *Anisandrus dispar*, *Aspidiotus ostreaeformis*, *Lepidosaphes ulmi*, *Bacillus amylovorus*, *Bacterium tumefaciens*, *Venturia pirina*, *Nectria galligena*, *Physalospora Cydoniae*;

Diseases and pests of the plum:— *Eriophyes similis*, *Anisandrus dispar*, *Aspidiotus ostreaeformis*, *Lepidosaphes ulmi*, *Bacillus amylovorus*, *Plowrightia morbosa*;

Diseases and pests of the cherry:— *Rhagoletis cerasi*, *Anisandrus dispar*, *Aspidiotus ostreaeformis*, *Lepidosaphes ulmi*, *Bacillus amylovorus*, *Bacillus spongiosus*, *Plowrightia morbosa*;

Disease and pest of the gooseberry:— *Bryobia praetiosa*, *Sphaerotheca mors-uvae*;

Pest of the black currant:— *Eriophyes ribis*;

Diseases and pests of the grape vine:— *Eriophyes vitis*, *Phylloxera vastatrix*, *Plasmopara viticola*, *Uncinula necator*;

Pests of the strawberry:— *Aphelenchus fragariae*, *Tarsonemus fragariae*;

Disease of the raspberry:— *Didymella applanata*;

Pest of the hazel:— *Eriophyes avellanae*;

Diseases of lilac:— *Pseudomonas Syringae*, *Phytophthora Syringae*;

Pest of firs:— *Dreyfusia nusslii*;

Disease of *Berberis Aquifolium*:— *Uropyxis sanguinea*;

Diseases and pests of flower bulbs:— *Rhizoglyphus echi-*

(1) Communication from the Ministry of Agriculture and Forests.

(2) Communication from the official correspondent of the Institute, Prof. Max EGLITS, Phytopathological Laboratory of the University, Riga.

nopus, *Merodon equestris*, *Pseudomonas Hyacinthi*, *Sclerotinia bulborum*, *Sclerotium Tuliparum*;

Diseases and pests of plants under glass:— *Aphelenchus olesistus*, *A. ritzema-bosi*, *Gracilaria azaleella*, *Stephanitis rhododendri*, *Aleurodes vaporarium*, *Coccidae* (all the species of this family), *Aplanobacter michiganense*, *Bacterium Pelargoni*, *Peronospora sparsa*, *Exobasidium discoideum*, *E. Rhododendri*, *Graphiola Phoenixis*, *Urocystis Cepulae*, *Puccinia Chrysanthemi*, *Coniothyrium Wernsdorffiae*, *Didymella Lycopersici*, *Septoria Azaleae*, *Gloeosporium Palmarum*, *Oidium Chrysanthemi*, *Oidium Hortensiae*;

Disease and pest of the potato:— *Leptinotarsa decemlineata*, *Synchytrium endobioticum*;

Plants the importation of which is forbidden:— *Berberis* (all species), *Rhamnus cathartica*, *Rh. Frangula*, *Pinus Strobus*.

Czechoslovakia. — In consequence of the outbreak of potato wart disease [*Synchytrium endobioticum*] within the jurisdiction of Vsetin, the Ministry of Agriculture has established by Ordinance of 11 March 1931 that in the districts of Wallachisch-Meseritsch, Rožnau on Rodhošt and Vsetin only varieties of potatoes resistant to wart disease shall in future be grown. The use of non-resistant potatoes is strictly prohibited; this regulation will remain in force for ten years as from the date of the promulgation of the said Ordinance. (*Landwirtschaftliche Fachpresse für die Tschechoslowakei*, Tetschen, 20. März 1931; 9. Jahrg., Nr. 12, S. 101).

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INTERNATIONAL BULLETIN

OF PLANT PROTECTION

DISCOVERIES AND CURRENT EVENTS *

Algeria: Information on the Last Anti-Locust Campaign (1).

The Crop Protection Service, in 1930 made provision, in drawing up the instructions for preventive measures to be taken against desert locust (*Schistocerca gregaria*), for the collection of these adults. The campaign has been largely carried out in the Department of Oran, but not, on the contrary, in some occasional communes of the Department of Algiers (Boghari) and Constantine. A procedure in turn extolled and disapproved of, we consider that it may still have some utility, if its application is considered in a rational and general manner. If it is to be justified, it must be taken up by all the syndicates of protection, pursued actively during the whole of the beginning of the season, and particularly, in the South and the High-Plateaux. It should end definitely towards June, as by then most of the eggs have been laid and the crickets are to be found in the sub-coastal or coastal regions at the end of their migration and also because parasitic action is then at its maximum. If it is carried out under such conditions at the moment when it would be relinquished for biological reasons, the swarms would already have been greatly reduced and the protection of valuable crops would be easier to accomplish. It should be done by hand, by rake, or by melhafa by squads of workers, paid, if possible, at piece work rates. The latter method of operation gives a very large yield in the evening from 6 p. m. onwards as the locusts, which no longer fly away, still possess a certain mobility; the same conditions exist in the morning but then during only a very short time. Collection is not opportune unless the lands infested have a sufficient density and are not too distant from the meeting-place of the workers. It is not advisable if the ground is covered with dense thorny bushes and should be replaced by the method of crushing with metal brooms, an operation giving high yields but difficult to control, or by burning by means of the Dragon.

Last season produced a valuable witness of the efficacy of the work for the destruction of nests of eggs and has permitted us to make most interesting comments on this preventive method. The best results have been obtained from work carried out just after the eggs have been deposited. That carried out a few days before the normal period of hatching has no consequences other than to hasten the process, only those eggs being destroyed which are bruised by the mechanical action.

* In this, as in the next chapter, the countries are arranged in French alphabetical order.

(1) Report of Mr. M. DELASSUS, Inspecteur de la Défense des Cultures, official correspondent of the Institute, transmitted by the General Government of Algeria (Direction de l'Agriculture et de la Colonisation).

The maximum yield has been obtained on relatively loose and not compact soils with the European plough working at a depth of 12 or 15 centimetres followed by a second cross cultivation or superficial hoeing.

The latter is absolutely indispensable on compact lands where the plough turns up numerous clods in which the clusters of eggs continue their normal development.

The work is advisable on all land accessible to the teams. After the laying of the eggs in the crops, particularly in cereals, it is found useful to cultivate the edges of the fields and of the ground tracks where the females generally assemble for the laying.

Harrowing, by repeated superficial cultivation or deeper turning should be effected, as soon as possible, in the places where the plough cannot pass, particularly in the patches encountered in the middle of the cereals or other crops, as these are always the places where the crop is very poor or where the adults have caused damage.

Poisoned bait has been the best means of suppressing the breeding grounds of desert locusts before the crops can be damaged. The formula has been slightly modified in recent years and the proportions of arsenate of soda and molasses have been changed to 0.5 kg. and 1 kg. respectively for 10 or 12 kg. of bran. Experiments carried out during the season give reason to assert that it would be possible, without inconvenience, to use 0.4 kg. of the poisonous salt to be incorporated in the mixture.

In certain regions of Algeria, some farmers have believed it possible, on the basis of information gathered during a journey in Morocco, to prepare baits with the reduced quantity of 15 kg. of arsenate of soda per quintal of bran. The results obtained were insignificant and it could not have turned out otherwise. The proprietors in question did not take into account the fact that in Morocco arsenious acid is used and not sodium arsenate.

Another interesting fact has been brought to light : that poisoned bran may in a campaign against locusts, be used very early, even against hoppers of only 3 or 4 days old and this means that its use makes possible the almost complete suppression of the cresyl sprays and the melhafas. This is a considerable advantage as the application of these two methods of combat would practically, and for various reasons, be impossible in the event of a serious invasion. Cresyl is a product which is rather rare in local trade and the furnishing of supplies to syndicates presents difficulties which are often insurmountable. The melhafas require a large amount of manual and even perhaps experienced labour, the successful recruiting of which cannot always be ensured in most of the regions of the Colony liable to invasion by locusts. Although the use of arsenic treated bran has been immediately taken up in a number of communes previously contaminated by the Moroccan locust (*Docostaurus maroccanus*) where its value was consequently well-known, we have, on the contrary, as formerly even in these same communes, met with much resistance in others which have not for many years experienced locust invasions.

It is sometimes not decided to have recourse to it until it has been considered whether it could not be possible to arrive at the result required by means of other methods of combat. The most intense opposition has been manifested in the Sersou. In actual fact, the efficacy of the mixtures was not always questioned, as in any case mention of this had been heard, but fears were entertained of the poisoning of livestock. A large number of such cases have, in fact, occurred. Since four years ago when the method was put into operation in the Colony, it is the first time that such losses have been recorded. The occurrence therefore causes astonishment, especially as Sersou is far from being the region of Algeria which consumes the largest quantities of toxic salts. It was interesting to attempt to seek its causes.

M. Marucci, a farmer at Vialar whose herds have been decimated, has already discovered one of them : the vengeance of natives, causing pre-occupation to Europeans proprietors, adding moreover, that in his opinion a large part of the misfortunes have the same origin. It may all the same cause surprise to learn that unused baits have been left in the fields at the end of the season instead of being immediately buried or destroyed in accordance with formal instructions given. All the cases of mortality however, cannot be ascribed to lack of watchfulness. At Hardy, for example, M. Boyer, agricultural adviser to the Miliana district, charged with the task of giving his opinion on what satisfaction should be accorded to demands for the indemnity of losses made by different farmers, was, in November, that is, four months after the cessation of the combative campaign, able to "extract cakes of bran two fingers thick and to obtain from two points on an area of 0.2 sq. metres 150 and 200 gms. of bran". In this case, therefore a grave error had been made by the foreman the sole cause being bad distribution. If the instructions, which have been constantly repeated and which our agents were again ordered to renew at each inspection of the station, had been strictly followed, the bran would have been broadcast in the same way as seed and the animals, other than the hoppers, would not have been able to absorb a sufficient quantity to be seriously poisoned. The natives, who are generally opposed to the use of this method of prevention, to get rid of the quantities of bait entrusted to them, distribute it in more or less large heaps instead of sowing it. This greatly diminishes its efficacy and the risk of poisoning is on the contrary, considerably enhanced. It must, further, be added that the bait is only rarely watched and cases of imprudence frequently occur ; the sacks, full of prepared bait, are sometimes left at the roadside and often in the farmyards ; stacks of poison also are sometimes made on the roads and footpaths ; a bad preparation does not assure good enough mixture distribution of the arsenate with the bran and the former is often found to be in fairly large lumps. The reports of technical agents furnish precise information on this question and show that, in many cases, the cases of mortality recorded might have been avoided if the indispensable precautions had been taken. At all events, there must be no hesitation, and if Algeria, in 1931, again experiences an invasion of locusts, the use of poisonous mixtures must be made general as it is the only way of saving the situation. To renounce it would imply taking a great responsibility.

The ' Société des Produits A. L. ', 1, rue Anatole France, Lille, experimented during last season, at first in the Taine region and then in that of Orléansville, with a new locust-killer. The conditions under which the experiments were carried out are described in the reports of Messrs. Dubuis and Lepigre, principal experts. Their conclusions were : " the product used has shown itself to be clearly superior to arsenate of soda and has permitted the quicker destruction of dense masses of desert locusts. The new formula excludes even molasses, a constituent which not only considerably increases the cost price but is also often difficult to transport ". If the results obtained were to be taken as a sole basis, there would be no hesitation, even for a single instant, in adopting this preparation, but the decision involves such grave consequences that it cannot be taken until after long reflection. Two items of information permitting a definite statement of opinion are still lacking ; the cost price of this insecticide and its composition. It is necessary, on the one hand, that the former should not be higher than that of bran arsenates and, on the other hand, that its poisonous properties for human beings and domestic animals should not be greater. If the inventor refuses to inform us of the elements contained in his cricket-killer, it is not at all certain whether the Administration, regardless of its admitted value, would be in a position to prescribe its use.

The ' Société Algérienne des produits chimiques et d'engrais ', rue de la Liberté, Algiers, has placed at our disposal, for experiment a certain quantity of the sodium fluor-silicate used first in the mixed commune of Sidi-Aïssa and then in that of Remichi by Messrs. Vaney and Rabot, principal experts. It is rather difficult to draw definite conclusions from these two demonstrations but recognition may all the same be given to the real efficacy of this product which has been used at the strength of 4 %, at the same time as a contact insecticide and as an internal poison. It is moreover, well known in Germany and America where it has given excellent results in combatting numerous kinds of insects. It appears at present to be difficult however, to substitute it for sodium arsenate. It seems indispensable that experiments with it should be pursued methodically during the next season ; if it yields, as may be expected, results of the kind obtained with the arsenic salt, then its adoption will have to be rapidly decided on. It is, in fact, a product having a price definitely below that of the latter salt (1.10 fr. instead of 2.80 frs.). Further, supplies to the syndicates would be greatly facilitated by the large stocks existing in Algeria.

In any case, if a momentary shortage of sodium arsenate were to arise during an anti-locust campaign, no fear need be entertained in making use of fluor-silicate.

A new scorching apparatus, the ' Dragon ' perfected by Messrs. Thibaudier and Fèvre of Algiers has been experimented with, with a certain amount of success during the last invasion. It consists of a cylindrical sheet-iron reservoir with autogenous welding, tested for a resistance of 5 kgs. per sq. cm. and having a capacity of 9 litres. In it is used a relatively economic fuel, gas oil (70 frs. per quintal), introduced through a hole in the upper part of the reservoir and capable of being hermetically closed by means of a metal plug. Inside, there is a Michelin air pump furnished at its end with a cork stopper ensuring the maintenance of pressure. The nozzle, about 1.75 m. long, is fixed to the apparatus by means of a simple rubber tube supported by clamps. It carries a copper tap, a filter plate of a system identical to that of some sulphur filters and another filter of tubular metal gauze fixed in the end. The latter contains the diffuser, the flame-screen and an asbestos wick. The first permits the violent ejection of a jet of liquid, which, on striking a flat surface, forms the slight mist necessary to ensure combustion of the gas-oil. The second protects the manipulator against the great heat evolved, concentrates the flame in the direction required and facilitates the decomposition of the gas-oil into the calories it contains. Lastly the asbestos wick serves to keep the flame alight in going from place to place or on surfaces devoid of all vegetation.

The colony has purchased 875 of these engines. They are decidedly superior to the Palanque apparatus hitherto in use. Their efficacy is greater, their flame hotter as the combustion of the gas is almost complete, their management is easier, their price (170 frs.) is modest, their working is economic as an apparatus can be worked continuously for twenty minutes and assure the treatment of 2-5 ares. They permit a more rapid achievement of the object required owing to the power of the flames, which reach, in both width and depth, from 0.5 metre to 0.75 metre and sometimes more. It must also be added that the process is not dangerous as the gas-oil does not ignite on contact with the flame, the apparatus is strongly made at least in its essential parts and is easy to handle, even by natives. It can be used without light for night work and is therefore also used to combat the adults.

It does not however, entirely avoid some disadvantages. Like all engines using fire, it really only represents an incomplete method and only partly destroys the hoppers. It must be used at a distance from forests and crops. Its cost price

is decidedly higher than if poisoned bait is used which, moreover, alone can give complete and final results. There are also some faults of the apparatus, which experience acquired during the last campaign will apparently make it possible to correct. The handling of the flame thrower at present requires two men : one to carry and the other to direct the nozzle, but the addition of a simple strap would render possible operation by one man. Two pumpings are indispensable for the complete utilisation of the liquid contained in the reservoir. It is also always necessary to have at hand on the land where the anti-locust operations are being performed a specialist capable of dismantling or rapidly repairing the apparatus. Despite the two filters with which it is provided, the diffuser frequently becomes choked, especially as gas-oil is a very impure fuel. Considerable loss of valuable time is incurred and most of the apparatuses of a single station may frequently be out of action for a rather long time. Lastly the pump valve fortunately modified in the latest engines delivered, is fragile and badly arranged.

When it has incorporated some modifications at present in course of realisation the " Dragon " will constitute, if the war flame throwers are excepted, the best fire apparatus so far placed at our disposal.

Climatic agents have, in many instances, caused the greatest destruction of locusts. At El Aricha, a swarm surprised last January by snowfall, was largely decimated ; rain and cold have similarly caused an interesting mortality of adults situated, at the beginning of March, near Victor-Durny (Batna district).

Even if, in some rare districts having light soils, the rain has constituted an obstacle by forming round the eggs a homogeneous medium opposing destruction by heat, yet in many cases, the climatic agents have brought about an important reduction in the areas contaminated or in the density of the egg clusters.

In the commune of Sidi-Aïssa a drying-up of eggs has been noticed over large areas, due, undoubtedly, to sudden dryness of the soil and the action of the sun. The rain, which formed a deep water cover over the egg-clusters in the Affreville commune, caused their complete rotting. It also, by furrowing the sides and bottoms of the gullies, caused the washing away and mechanical destruction of eggs (mixed commune of Braz), or the exposure of the clusters, consequently permitting their rapid withering by the sun. A violent wind has sometimes (Barika, M'sila, Hodna region) provoked a similar action. On some heavy lands profusely cracked by the sun's action (North of the mixed commune of Sersou) the same observation has been made.

Numerous predatory animals during last season, played a similar rôle, but always to a limited extent. In many places destruction of adults has been recorded, the agents being the jackal, hedgehog, jerboa, different species of rats, crows and storks etc. This destruction however seems insignificant in comparison with that brought about by the true parasites, the endophagous insects.

The egg clusters were sought for by numerous birds, especially the lark, to such a degree that their presence at a given place indicated the certain presence of egg deposits (Tolga).

The hoppers have been the prey of innumerable small birds a list of which would be too long to make and would also vary considerably according to the region taken into account. The valuable rôle played by the swallow is specially worthy of remark.

From the rearing of adults accomplished at the " Insectarium du Jardin d'Essai " there have been obtained three species of parasitic flies for which recognition is due to Dr. Villeneuve of Rambouillet : *Sarcophila latifrons*, to which apparently, should be attributed the almost complete suppression of the first swarms, actually of low

density reported in the mixed commune of M'sila, *Vohljarthia bella* and *Phaonia trimaculata*.

The part played by the latter two insects in the reduction of the invasion is, however, difficult to ascertain.

A fungus *Oospora ovorum*, the existence of which has been kindly confirmed by Dr. Maire, has shown great activity in numerous places, notably on compact soils the great humidity of which favours evolution (Marnia, Braz, etc.). It grows in the egg cluster, leading finally to its total destruction.

Two dipterous egg parasites have also been frequently observed : *Stomatorrhina lunata* and *Chortophila cilicrura*. The former has been by far the most widespread and efficacious. Its action has been particularly remarkable on the last layings and also on those which had a rather long period of incubation. Its destruction has sometimes attained 90-95 % (Trembles, Prudhon).

Scotland : Plant Diseases and Pests (1).

A disease of strawberries has occurred in the Clyde Valley. This is characterised by the plants dying gradually, first in single plants, then small round patches, finally whole fields succumbing. The leaves above ground wither but do not show any fungus. On examination at weekly intervals, it was found that the roots are attacked by a species of *Phytophthora*. This fungus causes the roots to rot off from the tip upwards. It is characterised by a large sporangium, by oospores of the two types and as far as has been ascertained is similar to *Phytophthora cinnamomi*. Field experiments on methods of control are being carried out by the Department of Agriculture for Scotland in the attacked area.

During 1930 there re-occurred a disease of Leeks known as 'White Tip' and the causal fungus has been isolated in pure culture. The symptoms included a wilt and rot of the leaves, the tips in most cases turning white. The disease became acute in the winter season as in past years, but it was found to spread slowly, and not so rapidly as in previous years. The fungus is considered a new species and named *Phytophthora porri* n. sp. Work has shown that infection probably starts from the soil, the distribution afterwards being from the leaves.

One of the most striking diseases caused by a virus was seen on *Auratum* lilies during the summer of 1930. The flower spike grew quite as high as usual, in some cases 7 feet, and the stem was large and sturdy. The appearance of this disease was very striking, the lower leaves being more or less normal, but up the stem the leaves became more and more abnormal. They turned downwards and sometimes made a complete circle, the point again pointing upward. They were not actually shortened, but looked shortened owing to the twist. One side of the leaf was often more contracted than the other, and they were striped lengthwise with bands of light and dark, with brown or rusty dying areas as the leaf grew older. The leaves often had long, tapering points, were stiffer than usual, and snapped easily if handled. The flowers were markedly distorted, almost aborted and the flower parts were green, abnormal, and often split. Sometimes a few distorted stamens remained but seldom developed anthers and were twisted and deformed. The pistil was much twisted and sometimes split into two or three. The whole plant had a most curious abnormal air, and the green leaves were twisted and queer. The disease is spread

(1) Communication from the Department of Agriculture for Scotland, Edinburgh, official correspondent of the Institute.

by sucking insects such as *Aphis* who carry the virus from plant to plant, therefore the spread of the disease may be rapid.

The Edinburgh and East of Scotland College of Agriculture reports that there has been a great increase in recent years of damage to potatoes by Slugs. Investigations on this question are now in progress.

On Azaleas recently imported from Belgium, the White Fly, *Aleurodes azaleae*, was recently discovered near Edinburgh for the first time in the British Isles. The infestation was small and no damage was being done. This insect was originally described from specimens intercepted on Azaleas from Belgium by the U. S. A. Quarantine Authorities.

The Onion Maggot, *Hylemyia antiqua*, has recently been discovered attacking spring-sown Leeks where these have been thinly sown and not transplanted.

In East Lothian, White Rot of Onion, *Sclerotium cepivorum*, has been unusually prevalent on Onions sown in July-August, 1930.

One case of Azalea Gall, *Exobasidium azaleae*, was recorded. The source of the infected plants was not known.

The North of Scotland College of Agriculture reports that an unusual symptom of the stem eelworm (*Tylenchus dipsaci*) disease of oats was recorded in May, 1930, wherein a young plant, 4 inches in height, revealed infection (adults, larvae and eggs) of the green leaves as well as the stem.

United States of America: Outstanding Entomological Features (1).

The present notes refer to March 1931.

The Hessian fly (*Phytophaga destructor* Say) is reported as comparatively scarce in Virginia and Ohio. On the other hand, in western and southeastern Iowa there appears to be a very heavy infestation.

Indications of possible chinch bug (*Blissus leucopterus* Say) trouble have been observed in central Illinois, central Missouri, and southeastern Kansas.

The first observation of eggs of the corn ear worm (*Heliothis obsoleta* Fab.) was reported from Galveston County, Texas, on February 10.

Local damage to peas, vetch, and alfalfa by the pea aphid (*Illinoia pisi* Kalt.) was reported from the Salt River Valley of Arizona and the Willamette Valley of Oregon.

Eggs of fruit aphids appear to be unusually scarce throughout the entire eastern part of the United States, westward to Kansas.

Throughout the Middle Atlantic States the codling moth (*Carpocapsa pomonella* L.) is abnormally abundant. The first observation of pupation* was reported March 30 from South Carolina.

Throughout the New England and Middle Atlantic States the eastern caterpillar (*Malacosoma americana* Fab.) is not numerous. On the other hand, reports of unusual numbers of this insect have been received from Arkansas and Texas. By the 22d of March caterpillars were about full grown in the vicinity of College Station, Tex., and eggs were hatching on March 12 at Fayetteville.

The San Jose scale (*Aspidiotus perniciosus* Comst.) is apparently increasing in the Middle Atlantic States and the East Central States. A very high winter survi-

(1) Communication from the official correspondent of the Institute, Mr. J. A. HYSLOP, Senior Entomologist in Charge, Insect Pest Survey and Public Relations, Bureau of Entomology, United States Department of Agriculture, Washington, D. C.

val is reported from Central Illinois running from 60 to 70 per cent., while in this district a normal survival is only from 25 to 30 per cent. Survival was also high in the Great Basin section.

The European red-mite (*Paratetranychus pilosus* C. & F.) is reported as unusually abundant in New England and very scarce throughout the Middle Atlantic States.

By March 27, approximately 7 per cent. of the overwintering larvae of the oriental fruit moth (*Laspeyresia molesta* Busck) had pupated at Thomaston, Ga., while we have a report of the emergence of this insect in cages in South Carolina on March 9.

The first overwintering adult of the plum curculio (*Conotrachelus nenuphar* Hbst.) was collected in an orchard at Thomaston, Ga., March 25. Last year the curculio was first observed at this place on March 17. At this time last year a thousand beetles were collected while only one was collected March 25 this year. Petals were falling from peach trees of the Hiley and Elberta varieties on this date and this advance of the peach crop as compared with the curculio emergence may make it possible to harvest Elberta peaches before the second brood appears. The plum curculio is also emerging later than usual in northern Florida.

Adults of the pear psylla (*Psylla pyricola* Foerst.) was observed on March 22 at Amherst, Mass.

The green citrus aphid (*Aphis spiraccola* Parch) is doing serious damage on the lower east coast of Florida and there are occasional heavily infested trees as far north as Marion County. Present indications are, however, that the damage will be light this year.

The cottony-cushion scale (*Icerya purchasi* Mask.) is again appearing in scattered infestations in the Salt River Valley of Arizona.

The vegetable weevil (*Listroderes obliquus* Gyll.) is spreading around the Gulf of Mexico, having been reported from four counties in Texas and four additional counties in Florida.

The western spotted cucumber beetle (*Diabrotica soror* Lec.) left hibernation quarters near Forest Grove, Oreg., January 25, practically a month earlier than last year. In spite of this early issuance egg development seems later than at this time last year. In March the adults were very numerous in Australian winter peas, all the specimens observed were females.

The first Colorado potato beetles (*Leptinotarsa decemlineata* Say) reported this season were from Biloxi, Miss., and College Station, Tex., March 21.

The cabbage aphid (*Brevicoryne brassicae* L.) is unusually abundant in the vicinity of Norfolk, Va., and in parts of South Carolina.

The beet leafhopper (*Eutettix tenellus* Bak.) is reported as very abundant in the Lewis Falls district of Idaho. Winter mortality appears to have been very light in this territory.

The California tent caterpillar (*Malacosoma californica* Pack.) is extremely prevalent around Phoenix, Ariz., this year, where it is defoliating cottonwood trees and severely injuring apricots.

The Birch leaf-mining sawfly (*Phyllotoma nemorata* Fallen) is reported from Essex County in New York, where it seems to be well established.

LEGISLATIVE AND ADMINISTRATIVE MEASURES

Germany (Bremen) (1). — By an Order of 31 March 1931 concerning the control of elm disease (*Graphium ulmi*) any owner or holder of land who shall observe elms growing on his land showing symptoms of the disease, such as sudden withering or yellowing of the leaves, branches or the whole trees, shall within a week notify the nearest police station.

The Plant Protection Station of Bremen is responsible for determining whether or not it is a case of elm disease.

The owner or holder shall on orders from the police according to the seriousness of the disease fell or cut back the infected trees. Cut surfaces of lopped trees shall be coated with tar or carbolineum. Felled branches must be burnt. Felled trees must have the bark removed and infected bark and branches burnt. Stumps of felled trees must be grubbed or, where this is impracticable, be coated with tar or carbolineum. Any new shoots which develop must be destroyed each year.

Any infringement of this Order will be punishable by a fine not exceeding 150 RM or in case of insolvency by imprisonment for a term not exceeding 14 days.

England. — The regulations at present in force (Colorado Beetle Order of 1923) against the introduction of the Colorado beetle [*Leptinotarsa decemlineata*] into this country prohibit the importation from France of potatoes, tomatoes and living plants grown within 40 kilometres of any place where the beetle has been known to exist.

The Colorado Beetle (Amendment) Order of 1931, dated 16th April, 1931, and which comes into force on May 4, 1931, extends the radius from 40 kilometres to 75 kilometres. (*Colorado Beetle (Amendment) Order of 1931. Dated 16th April, 1931. (D. I. P. 560).* [London, 1931], 1 p.).

*** The Importation of Raw Cherries Order of 1931, dated April 23, 1931, which comes into operation on June 3, 1931, and shall remain in force until September 30, 1931, enacts as follows:—

Restriction on Importation of Raw Cherries.

1. For the prevention of the introduction of the Cherry Fruit Fly [*Rhagoletis cerasi*] the landing in England or Wales, after June 2, 1931, of any raw cherries grown in any European country other than France, Italy and, except as herein-after provided, Germany, is hereby prohibited unless each consignment is accompanied by a certificate of origin visé by a Local Authority in the country of origin stating the country and place where the raw cherries were grown.

The certificate prescribed in this Article shall be delivered to an officer of Customs and Excise at the same time as, and together with, the entry relating to the consignment.

(1) Communication from the Biologische Reichsanstalt für Land- und Forstwirtschaft, Berlin-Dahlem, official correspondent of the Institute.

Restriction on Importation of Raw Cherries grown in France.

2. Raw cherries grown in France shall not be landed in England or Wales after June 2, 1931, unless accompanied by a certificate issued by an officer of the French Phytopathological Service in the form A set forth in the Schedule to this Order.

The certificate prescribed in this Article may cover all the consignments included in one cargo, and shall be delivered to an officer of Customs and Excise at the same time as, and together with, the entry relating to the consignment.

Restriction on Importation of Raw Cherries grown in Italy.

3. Raw cherries grown in Italy shall not be landed in England or Wales

(a) during the period beginning on June 6, 1931, and ending on the June 10, 1931, unless accompanied by a certificate issued by an officer of the Italian Phytopathological Service in the form B set forth in the Schedule to this Order ;

(b) after June 10, 1931.

The certificate prescribed in this Article may cover all the consignments included in one cargo, and shall be delivered to an officer of Customs and Excise at the same time as, and together with, the entry relating to the consignment.

Restriction on Importation of Raw Cherries grown in Germany.

4. Raw cherries grown in Germany shall not be landed in England or Wales

(a) during the period beginning on June 3, 1931, and ending on June 29, 1931, unless each consignment is accompanied by the certificate of origin prescribed in Article 1 of this Order ;

(b) after June 29, 1931, unless accompanied by a certificate issued by an officer of the German Phytopathological Service in the form C set forth in the Schedule to this Order.

The certificate prescribed in sub-paragraph (b) hereof may cover all the consignments included in one cargo, and shall be delivered to an officer of Customs and Excise at the same time as, and together with, the entry relating to the consignment.

Disposal of Raw Cherries landed in Contravention of this Order.

5. Raw cherries landed in England or Wales without such a certificate as is prescribed in this Order shall be forthwith destroyed by and at the expense of the importer unless they are re-exported or are disposed of in accordance with the terms of a licence issued by an Inspector.

Powers of Inspection and Entry.

6. An Inspector may, upon production, if so required, of this appointment or authority, open and examine and take samples of the contents of any consignment

or package containing or suspected to contain, raw cherries which have been shipped or are suspected to have been shipped, from any European country, and enter any premises upon which any such raw cherries are or are suspected to be.

Offences.

7. Any person wilfully obstructing or impeding an Inspector of the Ministry of Agriculture and Fisheries in the exercise of his powers under this Order, or failing to comply with the provision of Article 5 of this Order, or with the terms of any licence granted thereunder, shall be liable to a penalty not exceeding ten pounds, or, in respect of a second or subsequent offence, to a penalty not exceeding fifty pounds.

Schedule.

CERTIFICATE TO ACCOMPANY RAW CHERRIES GROWN IN FRANCE AND LANDED AFTER 2ND JUNE.

Form A.

This is to certify that the raw cherries included in the shipment described below were grown within the Zone described in the Schedule to this Certificate.

Number and description of packages in shipment
Date and Port of Shipment
Name of Vessel
Signature
Official Status
Date

Schedule.

DESCRIPTION OF ZONE.

The Department of Calvados, and the Cantons of Quillebeuf, Pont-Audemer, Beuzeville, Routot, Montfort-sur-Risle, Cormeilles, St. Georges-du-Viévre, Bourgheroulde, Amfreville, Brionne, and Thiber-ville, in the Department of Eure.

CERTIFICATE TO ACCOMPANY RAW CHERRIES GROWN IN ITALY AND LANDED BETWEEN 6TH AND 10TH JUNE.

Form B.

This is to certify that the raw cherries included in the shipment described were grown within the Region of Emilia.

Number and description of packages in shipment
Distinguishing Marks
Date of Dispatch
Port of Shipment
Signature
Official Status
Date

CERTIFICATE TO ACCOMPANY RAW CHERRIES GROWN IN GERMANY AND LANDED AFTER 29TH JUNE.

Form C.

This is to certify that the raw cherries included in the shipment described below were not grown south of Latitude 53°N. or in East Prussia.

Number and description of packages in shipment	.....
Distinguishing Marks	.....
Date of Dispatch	.....
Port of Shipment	.....
Signature	.....
Official Status	.....
Date	.....

(Statutory Rules and Orders, 1931, No. 332. Destructive Insect and Pest, England. The Importation of Raw Cherries Order of 1931. Dated April 23, 1931. [D. I. P. 561]. London, 1931, 4 pp.).

Belgium (1). — By Ministerial Decree of 27 March 1931 Art. 1 of the Ministerial Decree of 28 June 1927 (see this *Bulletin*, 1927, pp. 94-95) is modified as follows:—

'Importation into Belgium of fresh cherries coming from France, Italy and Germany is allowed only if consignments are accompanied by a certificate issued by the Phytopathological Service of the country of origin to the effect that: (a) the products come from a region free from *Rhagoletis cerasi* and (b) the consignments themselves have been found by the said Service to be free from *Rhagoletis*'.

French Colonies and Mandated Territories. — By Ministerial Decree of 11 February 1931 paragraph 1 of Art. 6 of the Ministerial Decree of 7 December 1926 concerning the protection of banana plantations in the French Colonies against 'Panama disease' caused by *Fusarium cubense* has been modified and completed as follows:—

"Article 6. — The provisions of the present Ministerial Decree are applicable to banana plants delivered for importation or transit in the French Colonies other than Indochina and the French Mandated Territories hereinafter specified: — French West Africa, French Equatorial Africa, Madagascar and Dependencies, Réunion, New Caledonia and Dependencies, French Settlements in Oceania, French Guiana, Martinique, Guadeloupe and Dependencies, Togo and Cameroon".

(Ministère des Colonies. Institut National d'Agronomie Coloniale. *L'Agronomie Coloniale*, Paris, 1931, 20^e année, n° 158, p. 55-56).

Italy. — By Ministerial Decree of 12 April 1931 the Commune of Santa Croce di Magliano in the province of Campobasso has been declared infected with grape phylloxera, (*Gazzetta Ufficiale del Regno d'Italia*, Roma, 22 aprile 1931, anno 72^o, n. 92, p. 1781).

(1) Communication from the Ministry of Agriculture to the International Institute of Agriculture.

** In view of the necessity of providing for the control of the mole cricket [*Gryllotalpa gryllotalpa*] in the province of Rovigo, by Ministerial Decree of 30 April 1931 the regulations prohibiting the trapping and killing of moles [*Talpa europaea*] which were legalised by Ministerial Decree of 28 March 1928, have been extended to this province. (*Gazzetta Ufficiale del Regno d'Italia*, Roma, 13 maggio 1931, anno 72^o, n. 110, p. 2115).

Morocco French Zone. — A Ministerial Decree of 4 April 1931 (15 kaada 1349) provides as follows :—

Art. 1. — The administrative districts of Oujda and Taza are declared infected with the pink bollworm of cotton (*Pectinophora gossypiella* Saunders).

Art. 2. — Within the limits of the infected districts cotton may not be cultivated or allowed to remain in growth for three years from the date of publication of this Decree in the *Bulletin Officiel* of the Protectorate.

Art. 3. — Cotton seed existing within the limits of the infected districts must be immediately destroyed or exported for industrial utilisation.

Art. 4. — Cotton plants, leaves, bolls, unharvested seeds and all debris of cotton plants in the infected districts must be destroyed without delay.

Art. 5. — In the case of owners, holders or other occupiers of land not carrying out the orders contained in the preceding articles the required measures will be officially executed at their expense by the control authorities or their agents, without prejudice to the application of the penalties provided in article 31 of the dahir of 20 September 1927 (23 rebia I 1346).

Art. 6. — The provisions of the present Decree, in particular those of Arts. 2 and 4, are applicable to all species of the genera *Gossypium*, *Hibiscus*, *Abutilon*, *Malva* and all other genera of the Malvaceae, whether the plants are of economic or ornamental use or are growing in crops, pasture, gardens or other places.

Art. 7. — These regulations do not apply to plants grown by the District Crop Protection Inspector or, in his default, by any agent duly authorised by the Directeur général de l'Agriculture, du Commerce et de la Colonisation, for purposes of control of the pink bollworm. (Empire Chérifien. Protectorat de la République Française au Maroc. *Bulletin Officiel*, Rabat 17 avril 1931, XX^e année, n^o 964 p. 497).

Wales. — See England.

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MATSUMOTO, TAKASHI, and SOMAZAWA, KÔRTSU. Immunological studies of mosaic diseases. 1. Effect of formolization, trypsinization and heat-inactivation on the antigenic properties of tobacco mosaic juice. *Journal of the Society of Tropical Agriculture*, Taiwan (Formosa), Japan, 1931, Vol. III, No. 1, pp. 24-32.

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[*Locusta migratoria*].

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[*Cleonus mendicus*, *Cassida vittata*, *C. nobilis*, *Chaetocnema tibialis*, *Pegomya hyoscyami*; less serious damage is caused by mole crickets, by *Pentodon punctatum*, *Cebrio* sp., *Lixus junci*, *L. scabricollis*, etc.].

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[*Tilletia Triticis*, *T. laevis*].

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[*Tilletia indica* n. sp. Description in English].

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[In Spanish, with title and summary in French].

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[A Curculionid not yet identified, observed as yet only in the larval state].

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[Part I of the present volume (pp. XXXVIII + 577, 1 map, 4 figs., 6 pls.), drawn up by the former of the two authors, contains on pp. 41-58 a list of the 130 fungi collected up to the present in Cirenaica].

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[The species concerned is a parasite of *Pyrausta nubilalis*].

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[The observations suggest that the phenomenon is due to internal factors (special susceptibility in certain varieties of wheat to the action of moist cold on the leaf tissue in spring when it is still in the embryonic stage) and to external factors. Among the latter moist cold in spring coinciding with a particular stage of growth of the plants must be taken into particular consideration].

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[Diseases and pests observed in Italy and the Italian Colonies in Africa. Certain cases observed in Yugoslavia are also recorded].

PETRI, L. Sull'« arricciamento » della vite. *Bollettino della R. Stazione di Patologia Vegetale* [di Roma], Firenze, 1931, anno XI, n. ser., n. 1, pp. 61-83, figg. 1-11, tav. I.

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[*Colletotrichum circinans*].

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[*Deuterophoma tracheiphila* Petri].

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SYDOW, H. Novae fungorum species — XX. *Annales Mycologici*, Berlin 1930, Vol. XXVIII, No. 5/6, S. 432-447.

[Latin diagnoses of 4 genera and 11 species new to science, collected with one exception outside Europe].

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[The Latin diagnosis is given amongst others of *Puccinia Matricariae* n. sp.].

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[*Graphium Ulmi*].

YOSHINAGA, TOMAMA, and HIRATSUKA, NAOHIDE. A list of Uredinales collected in the province of Tosa. *The Botanical Magazine*, Tokyo, 1930, Vol. XLIV, No. 528, pp. 627-667. Bibliography on Uredinales of the province of Tosa, pp. 666-667.

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[In French, with title and summary in English (pp. 99-100). *Locusta migratoria* L. subsp. *capito* Sauss.].

ZOLOTAREVSKY, B.-N. Le criquet migrateur (*Locusta migratoria capito* Sauss.) à Madagascar. *Annales des Epiphyties*, Sceaux, 1930, 15^e année, 1929, n^o 4, p. 185-236, fig. 1-8, pl. I-III. Liste des ouvrages cités, p. 234-235.

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NOTES

International Competition for the Control of two Diseases of Cacao. — The Ecuador Government has announced an international competition for the discovery of a simple, economic and effective method for the prevention and cure of the two principal diseases of cacao in the Republic, which are known locally as 'escoba de la bruja' [witches' broom] and 'monila' [*Monilia* disease]. The individual or institution discovering such a method will be awarded a million 'sucres'.

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